Strategies for 'Greening' the New Zealand Honey Industry:

An Evaluation of the Development of Organic and Other Standards

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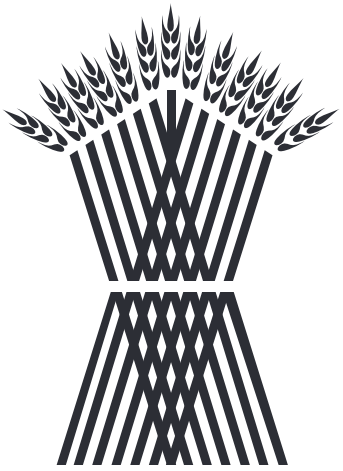

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Executive Summary

This study of the NZ Honey Industry is part of a larger research programme examining the 'greening' of five sectors within horticultural production - kiwifruit, wine, squash, apples and honey. The main aim of the research programme is to identify the current configuration of horticultural industries towards 'greening' and to identify social and industry dynamics which are promoting or inhibiting the development of 'green' strategies.

A programme of interviews with a range of people involved in the honey industry (beekeepers, packers, exporters, research scientists, government officers etc) was carried out between February and August 1999. Overall people were chosen to enable representative viewpoints and perspectives to be documented. Since the honey industry is characterized by widely differing opinions, the study attempts to record the range of perspectives on key issues.

It is evident that honey is already commonly seen as a 'natural' and often 'green' product and that 'organic' production requirements are not too different from 'conventional' production practices. Because of this existing 'natural' perception, the majority of producers are not interested in further 'greening' of the product, particularly because of the possible increased costs involved. Unlike other horticultural sectors, the honey industry has not suffered an 'integrity crisis' for its products, which contributes to the lack of motivation for further 'greening'. In addition, since honey is primarily sold on the domestic market, the industry has not yet been unduly affected by the demands of overseas customers for increasing food safety and quality management systems. These features of the industry combined with the strong individualistic character of many industry participants has resulted in a very low sense of urgency about 'greening' honey, especially compared with producers in the kiwifruit, pipfruit and wine industries.

There is widespread dissatisfaction with the Bio-Gro organic honey standards amongst both organic and conventional honey producers and industry personnel. A number of aspects of the standards could usefully be reviewed including the highly contentious issues of sugar feeding and the temperature to which honey can be heated. Since it is likely that other standards may become available to honey producers in the future, it is suggested that Bio-Gro NZ urgently review its standards taking into account international trends and practical production constraints within the context of organic principles and philosophies.

Given the move towards the development of food safety programmes/risk management programmes within the whole of the food industry, the honey industry will also have to develop audited quality management systems. In establishing such systems, the industry could also include standards relating to different honey varieties and the unique nutraceutical properties of honey. It is unlikely however that the industry will develop in this direction as a united body given the divergent views expressed on standards.

It is imperative that the special relatively disease-free status of NZ honey production, compared with other countries, is preserved and that imports from countries with pest and disease problems are continued to be vigorously opposed. Clearly NZ has a unique advantage over most other countries which should not be compromised.

To facilitate the continuing development of the honey industry, there needs to be a review of the key industry organization, the National Beekeepers Association. Given the wide range of products, activities and interests within the industry, it is likely that a new structure is needed to best serve the industry. The enthusiasm and experience of many involved in the industry will serve the industry well as it establishes an agreed management and operating structure.

Chapter 1
Introduction: Background, Objectives and Methodology

The overall aim of this research programme is to examine the 'greening'of five sectors within NZ Horticultural production - kiwifruit, wine, squash, apples and honey. This study of the honey industry comes at the later stages of a 5-year programme of research into the differing strategies that horticultural industries are deploying to respond to 'greening' pressures in markets. In prior studies into the processed vegetable (Campbell, 1996), kiwifruit (Campbell et al., 1997), sweetcorn (Coombes et al., 1998) and organic fresh fruit and vegetable (Coombes and Campbell, 1998) industries, various factors were identified which have created a new trading environment for horticultural exports. Specifically, an environment in which increasingly stringent 'food safety' and 'environmentally enhanced' criteria are applied to food exports is developing - both at the regulatory level and in the purchasing preferences of distributors and consumers (Campbell and Coombes, 1999). While the overall findings of prior industry studies have identified a general trend towards 'greening' exports, the pressures for greening are felt unevenly through horticultural sectors and levels of response have also varied significantly. The purpose of the current series of industry studies is to identify the current configuration of horticultural industries towards greening, and to identify the kinds of social and industry dynamics which are influencing industry strategies (or inhibiting the formation of such strategies) in each sector. Each report therefore serves as a benchmark for each industry that can then be used to assess the overall movement towards sustainable practices in NZ horticulture.

Honey was selected as a case study industry for a number of reasons. Firstly, while most 'greening' sectors are controlled by one producer board or characterised by a major company with a near monopoly position, the honey industry represents the opposite extreme - an industry characterised by networks of strongly individualistic producers (individualistic both in attitude and in industry configuration) who have often moved away from any central organisation of the industry. Secondly, the honey industry trades in a commodity that is already perceived as a 'natural' product prior to the establishment of any labelling or auditing system. Thirdly, honey is, unlike most other horticultural sectors, oriented towards the domestic market, and therefore faces fewer regulatory pressures than is experienced by exporters, and also is mainly dealing with the food preferences of specifically New Zealand consumers (as against the somewhat greener sensibilities of the EU or Japan). Finally, the honey industry has some unusual characteristics that are influencing industry strategy. These include the small scale of the industry, the low level of government participation, the degree to which personality politics influences sectoral decision making, and the peculiarities of the labour process and skills base of the industry.

The results presented in this report on the honey industry were based on a programme of interviews with beekeepers, packers, exporters, research scientists and others involved in the industry. Since a small number of beekeepers have chosen to gain organic certification, organic beekeepers were also included in the interview programme. A total of 27 interviews were carried out between February and August 1999. Beekeepers from different regions of the country were interviewed (Otago, Canterbury, Hawkes Bay, Poverty Bay, Bay of Plenty, Waikato, Northland) in order to gain an understanding of any particular regional management practices or issues. Due to the small size of the industry random sampling was impossible, and those interviewed were selected to form a representative sample, initially from suggestions made by key industry personnel and then from recommendations made by some of those interviewed. Organic beekeepers were selected from the Bio-Gro licensee list provided by Bio-Gro New Zealand. Overall, people were chosen to enable a representative range of viewpoints and perspectives to be documented. Interview transcripts were summarized and information categorized according to the principal themes (Sarantakos, 1998). Reporting of industry opinion was relatively unproblematic where a general consensus occurred around specific issues and the opinions of lone dissenting voices were generally disregarded. However, the honey industry is characterised by widely differing opinions, so where significant groups within the industry differed in opinion, this report attempts to record the various perspectives on each issue. The study was reviewed and approved by the Ethics Committee of the Department of Consumer Sciences, University of Otago.

The report adopts the following structure:

- Chapter Two presents a brief introduction to honey production for the benefit of readers unfamiliar with the industry (readers familiar with the industry may wish to skip this section). Then the current economic state of the industry is introduced. There are also some key contextual issues to any attempts to 'green' the honey industry. These are the unique political structure of the industry and the varying at-

tempts to co-ordinate marketing activities in the industry. Both these areas are discussed in Chapter Two.

- Chapter Three discusses one option for further greening the industry - organic honey production. This chapter outlines the relatively small 'distance' between conventional and organic honey production and then discusses the development of organic honey standards, and the current status of other standards for organic honey around the world.
- Chapter Four. Honey has the attributes of a 'natural' product in many respects, so there is no equivalent to a 'middle tier' between organic and conventional honey production compared with other industries like kiwifruit (KiwiGreen) or pipfruit (Integrated Fruit Production - Pipfruit). Consequently, in order to fully market an environmentally enhanced honey product that is nevertheless not fully organic, the honey industry does not need to revise its current production practices, but rather audit them and establish marketable standards. Chapter Four investigates the issue of standards development in the industry, reviewing past attempts to develop standards and details the complexities of developing and auditing standards for honey production and the potential industry barriers to achieving marketable standards. Since there is currently considerable discussion amongst industry participants regarding the purpose, content and usefulness of a range of standards it is hoped that this report provides a valuable background document for continued debate.
- Chapter Five presents a summary of the current state of the honey industry and the issues which may influence further greening of the industry. The report concludes with our recommendations.

Chapter 2

An Overview of the New Zealand Honey Industry

2.1 An Introduction to Honey Production

THE greening of the honey industry is strongly influenced by some of the attributes of the honey production process and the existing relationship between bees and their surrounding environment as well as the unique political and social structure of the industry. In order to analyse greening, it is necessary, therefore, to review the way in which honey is produced, the nature of its producers, and the overall structure of the industry.

2.1.1 Beekeeping Practices

The bulk of beekeepers in New Zealand keep bees as a hobby hence relatively few beekeepers actually make a living from producing honey and other bee products, although these producers own the majority of registered hives. As of June 1999, only 20% (955) of the total number of beekeepers were classified as 'commercial' (having over 10 hives) and this group kept 96% of the hives. The two groups are not entirely separate as commercial beekeepers have usually started off as hobbyists and/or have ventured into the craft of beekeeping because of a family background in the industry.

Producing honey commercially is a time consuming and laborious activity. Like other forms of farming, the work does not conform to the conventional 40 hour week. It is a seasonal activity which is highly attuned to the activities of bees. The labour process represents an archaic form of production which has been relatively untouched by industrial processes and relies on the traditional knowledge-based and manual skills of honey production. The influence of technology is limited due to the nature of the work which requires understanding bee colony behaviour, the natural cycles of germinating flora, weather patterns and seasonal conditions (Newton, 1999). These sorts of skills often cannot be substituted by technologies. Consequently, beekeepers operate within a labour process that is dominated by natural rhythms and requires a cooperation with natural factors to a greater degree than any other conventional farming system.

Commercial beekeepers keep bees on land owned by local farmers in order to make the most of flowering nectar and pollen sources. Bees collect nectar as an energy source and to produce honey, and pollen provides a feed supplement high in protein, fats, vitamins and minerals (Matheson, 1997: 26). The availability and nature of nectar and pollen sources varies according to geographical area. In Canterbury, for example, clover pastures, gorse, nodding thistles and eucalyptus trees are valuable pollen and nectar sources. Bees can forage on cultivated crops or pasture plants, native trees and shrubs, as well as introduced weeds (Matheson, 1997: 26). Different honey varieties result from the particular nectar sources being visited by bees, and beekeepers can influence what floral sources are available by the placement of hives in relation to surrounding sources and through intimate knowledge of bee foraging behaviour.

The places where groups of beehives are kept are called apiaries, and beekeepers may travel many kilometres from their homes in order to visit their apiary sites. Depending on the characteristics of the area where bees are kept, and the nature of the work being performed, beekeepers may manage up to four hives on a large pallet. The number of hives managed per apiary also varies according to local conditions with flat land lending itself to more hives per pallet.

Each hive comprises a colony of approximately 60,000 bees and normally one queen bee. During the cooler months, bees hibernate and are able to be 'wintered down', that is, given sufficient quantities of food (honey or sugar syrup) to survive their hibernation period. The timing and duration of the hibernation period differs according to the season and the characteristics of the local environment. Beekeepers have to keep a keen eye on the weather in order to anticipate their bees' needs. As soon as the weather warms up, bees emerge from their hives in search of food. Hives are usually re-queened in the spring in order to maximise the colonies' foraging abilities during the honey flow. This entails removing old queens and replacing them with new cells with either one or two queens - usually purchased from a specialist breeder. Beekeepers agree that the different qualities of queens are an important variable in their production process but disagree as to the specifics of why this is the case.

During the 'honey flow' in the summer months, when bees are collecting nectar from flowers, beekeepers work long hours regularly attending to hives, removing 'supers' (boxes full of honey) from the hives (while leaving enough for bees to feed on), and processing the honey for packing. Supers have to be replaced with 'dry' boxes in order for the bees to continue producing and storing honey in the hive. In good seasons, beekeepers will 'take off' honey a number of times.

Throughout the season, beekeepers also check their hives for signs of disease. One of the New Zealand honey industry's critical natural advantages is the relative absence of diseases that are

common overseas. American Foulbrood is the only significant disease New Zealand beekeepers have to combat. Hives found to be contaminated with the disease have to be immediately destroyed by burning. AgriQuality New Zealand currently has the contract to carry out the National Pest Management Strategy for American Foulbrood for the National Beekeepers Association (see sections 2.5.1 and 4.2). The New Zealand industry also is protected by biosecurity legislation to protect against the potential arrival of new diseases from overseas.

2.1.2 Honey Extraction

Most commercial beekeepers tend to own their own extracting plants - called honey houses - or have access to honey houses of other beekeepers in their areas. A number of large-scale commercial beekeepers extract honey on a contract basis for other beekeepers. In the honey house, a series of machines, pumps, tanks and pipes extract and process the honey ready for packing (Matheson, 1997:97).

Supers containing eight or nine frames of honeycomb, are usually stored in a 'hot room' for a few days prior to extraction so that the honey contained on the frames is warm and flowing. Temperatures in the hot room vary according to the type of honey being extracted. Clover honey, for instance, is relatively straightforward to extract as it tends to be more fluid. This means it does not normally require heating over 38°C in order to remove it from the frames. Most extracting plants will also have hot water heating systems to sustain the temperature of the honey as it goes through the plant. This enables it to be pumped more easily through the various pipes.

During extraction, frames of honeycomb are removed from the supers and placed into an uncapping machine which removes the wax capping on the cells of the comb. The uncapped frames are subsequently positioned in an 'extractor', a large circular tank which spins the honey from the frames. Wax collected by the uncapping machine is usually pumped into a 'spinner', which separates remaining honey from larger wax particles. Spinners are increasingly common in extracting plants because they enable honey to be removed in ways requiring minimal use of heat. The honey is then fed into a header tank along with honey being pumped directly from the extractor, while the wax is retained in muslin sacks for subsequent recycling. In the header tank, remaining particles of wax and any dead bees are filtered from the honey and pumped into a baffle tank for refined filtering. The honey is subsequently pumped from the baffle tank into a large storage tank from which it is later run into 44 gallon drums.

A lot of beekeepers export their honey in this bulk form for overseas buyers to later pack into retail containers. Most beekeepers will pack a quantity of honey for consumption by family and friends, and others may decide to pack their own honey for retail markets. The majority of honey distributed in retail pots for the domestic and overseas market is 'creamed' honey, that is, honey prepared for packing using a 'starter' which after blending enables it to settle and thicken, or to 'crystallise', in the container after packing. This means that the final stage of the production chain for many beekeepers is a blending and granulation process. Honey in this form can be reheated at a higher temperature in order to return it to liquid form. Beekeepers may also distribute honey in liquid form, and this may depend on the variety of honey they produce.

Traditionally, commercial production of honey has revolved around bulk production of blended honey. Now, however, the industry is working towards differentiating and marketing particular honey varieties for respective sensory properties and use-values. Moreover, honey is only one of a range of products being sourced from the beehive. An increasing trend is for producers to manage their hives in ways to produce greater quantities of products like royal jelly, propolis and pollen, for distribution as natural health care products to markets, such as Japan and Australia.

Activities within honey houses are subject to considerable regulation (Matheson, 1997:132). The Food Hygiene Regulations 1974, the Food Act 1981, and the Food Amendment Act 1996 apply to industry participants. MAF Quality Management (now AgriQuality NZ) has previously acted as a consultant for beekeepers concerning honey house design and technology, and more recently for the development of Food Safety Programmes [HACCP (Hazard Analysis Critical Control Points) based] and Quality Assurance Programmes.

2.1.3 Prevailing Producer Attitudes, Skills and Local Knowledge

In a recent study of the New Zealand honey industry Newton (1999) outlined the social characteristics of participants in the industry. These characteristics are important for explaining why the uptake of greening strategies has not been coordinated by any central organisation or body. Basically, beekeepers self-select as participants in the industry according to the following characteristics:

- acting 'closer to nature' than conventional farming - seeing the environment 'through the bee's eyes',
- strong sense of individualism and rejection of external or bureaucratic control over their activities,

- strong sense of the specific identity of themselves as 'beekeepers'.

This identity is reinforced in the characteristic interactions of the honey industry. Beekeepers tend to work alone or within their families, and meet through a series of loose networks (political, local, and through information technology) in which the individualistic orientation of beekeepers coupled with a strong self-identity enables beekeepers to both interact with a high degree of interest in each other's activities, while never actually coalescing into a highly structured political unit. The political ramifications of this are detailed later in this chapter.

A second important social characteristic is the way in which beekeepers become skilled at their business and the degree to which these skills are directly related to specific localities. Local knowledge of geographical areas is crucial in beekeeping as there are many uncertainties implicit in beekeeping. Successful beekeepers possess intimate understandings of weather patterns, flowering flora, land topography, and farming practices of farmers, in the areas where they keep their bees. This knowledge is accumulated over time, and within families, leading to a particular pattern by which industry participants become skilled (Newton, 1999).

As local conditions are distinct in different areas, beekeepers prefer to keep bees in particular areas. This means they can develop detailed local knowledge of specific areas, and their ability to understand the environment and the behaviour of their bees within that environment improves over time. Being a successful beekeeper involves a long apprenticeship with bees, and learning through trial and error from past experiences. Like other farmers, they have a 'direct stake in the results of close observation' of nature and are 'immediate consumer[s] of [their] own conclusions' (Scott, 1998:324 in Newton, 1999:7).

Consequently, when hired labour is taken on, it is usually to undertake less skilled tasks. The primary skills of beekeeping run in families. Sons and daughters provide a ready labour force that can be socialised in the craft over time. Knowledge of 'good' beekeeping practice and of what constitutes a 'good' beekeeper is typically *family* knowledge. Many beekeepers are second, third and even fourth generation beekeepers, and have acquired their skill through participating in the family business as employees. They tend to take over the beekeeping outfits of family members and/or settle in the general area where they have grown up as a child.

This results in a characteristic pattern of skills development and new innovations which is primarily conditioned by what Kloppenburg (1991) described as 'local knowledge' as opposed to 'scientific knowledge', crosscut with the particularities of the family-based production unit. The local environmental aspects of beekeeping make this even more pronounced than in conventional family-based pastoral farming.

Outside the social context of the family and the networks among beekeepers themselves, producers must negotiate a third arena of critical social contact - local landowners. Commercial operators have apiary sites on land owned by local farmers, therefore they have to negotiate terms of access to, and usage of, the farmer's property. How successful beekeepers are in negotiating access and acquiring local information from farmers impacts on how they can subsequently manage bees in that apiary and ultimately the level of productivity attained from those hives (Newton, 1999:33-34). Again, family-based production patterns help establish long term access on many farms. Further, this networking with farmers is even more critical in the case of organic beekeeping.

The long term impact of changing pastoral and horticultural landuses on beekeeping can be considerable as a number of problems encountered by beekeepers are caused by surrounding farm and orchard practices. For example, spray issues were topical in the late 1930s and early 1940s when orchard owners started applying lead-based sprays on flowering fruit trees, causing spray damage to hives (Wallingford, unpublished:48). Similarly, in 1972, a Government Caucus Committee commented on the increased use of weed control by farmers reducing the number of nectar bearing plants for beekeepers. Spray damage is currently of increasing concern to beekeepers. The problem was recently highlighted in the 1998/99 season when a farmer used an inappropriate chemical and applied it at the wrong time of day.

2.1.4 Regional Variations in the Industry

There is considerable regional variation in the practice of beekeeping. This not only involves distinct geographical factors like climate, flora, and land topography but also complex interrelationships between beekeepers and other regional styles of farming practice like orcharding, market gardening, or pastoral farming. Two clear examples of this kind of regional variation are the Bay of Plenty and Canterbury. These examples indicate that the nature of beekeeping operations are continually undergoing change in response to 'external' forces.

The Bay of Plenty has a number of unique regional characteristics which influence beekeeping. The primary area of change is in the emergence of kiwifruit production which requires extensive pollination. Beekeepers have developed

specialist pollination services as an alternative to or alongside honey production. The emergence of pollination services has required a reworking of the entire relationship between beekeepers and local orchardists (and MAF).

Canterbury has traditionally been a popular honey producing region due to an abundance of clover pastures. The region is marked by relatively high numbers of commercial operations, and high densities of hive holdings. Consequently, apiaries are operated to retain existing sites and to minimise interference with apiaries of other beekeepers (Newton, 1999). Canterbury 'beekeepers' have claims to 'traditional' sites as a strategy 'to hold a piece of turf' and to prevent other beekeepers 'robbing' sites if they happen to be temporarily vacated. Changing farming practices are influencing Canterbury beekeepers. As local cropping farmers in Canterbury grow a wider range of crops, they are increasingly requiring the pollination services of local beekeepers (Newton, 1999). This has ramifications for organic production in Canterbury. Greater hive densities created by pollination hives increases the likelihood of disease, and aerial applications of agricultural sprays in Mid-Canterbury poses a threat for honey producing hives used for pollination work as well as for organic production.

Regional variability, therefore, shapes how the beekeeping work is performed and has important consequences for the uptake of opportunities created by the global marketplace. The extent to which beekeepers recognise and embrace these opportunities are both constrained and enabled by local conditions (Newton, 1999). Beekeepers are rendered more or less able to diversify into different honey varieties and bee products.

2.2 Honey Production, Statistics and Markets

There are 4914 registered beekeepers in New Zealand keeping 302,988 hives of bees (June 1999, MAF Apiary register). Of these, approximately 880 are commercial and ordinary members of the National Beekeepers' Association (NBA). In the 1998-9 season, 29.9kg of honey was produced per hive, and this was slightly below the six year average of 30.8 kg per hive (MAF figures). The figure is calculated on a national basis, and beekeepers in particular areas will have produced considerably more or less honey per hive depending on the conditions of the season in their respective areas. Statistics are collated from an apiary register managed by AgriQuality for the MAF Regulatory Authority. This register is currently used by the Authority for export certification purposes. The NBA has recently developed its own apiary register in order to better co-ordinate disease control measures under its National Pest Management Strategy for American Foulbrood (section 4.2).

The amount of honey produced in New Zealand in 1999 was 9069 tonnes, approximately 1000 tonnes more than the previous year. Figure 1 presents the total annual production from 1973-1999. While there has been considerable variation from year to year, there appears to have been a gradual increase in production over this period.

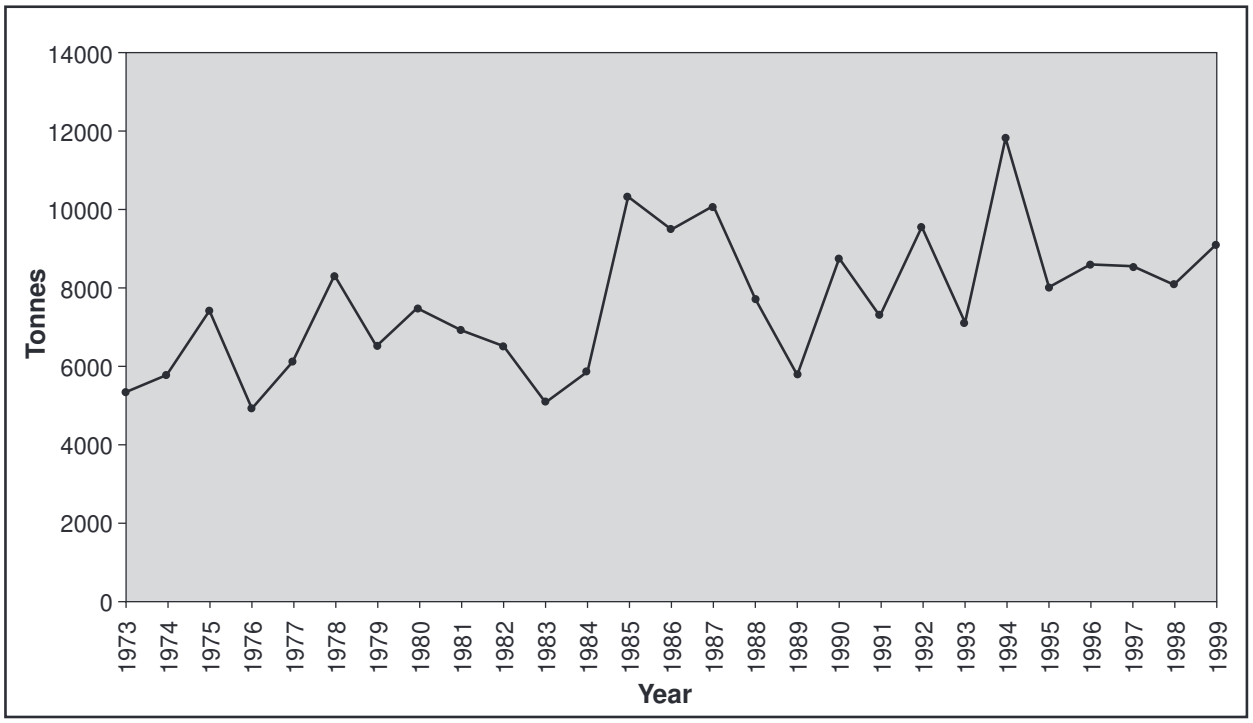

Figure 1. NZ honey production 1973-1999.

This increase can be attributed to an increase in the number of hives and also to changes in hive management practices, such as leaving less honey reserves on hive frames.

Figure 2 shows the change in numbers of beekeepers, apiaries and hives since 1973. The number of apiaries has generally followed the same trend as the number of hives until 1997 when the number of hives has increased while the number of apiaries has decreased. This may be due to the change that occurred in 1996, when the Commodity Levies Act superseded the Hive Levy Act 1978. This change provided beekeepers with an incentive to de-register unused apiary sites and/or to run more hives/apiary in order to reduce their levy payments.

Figure 3 shows the total honey production in NZ by region. The figures suggest that Canterbury/North Otago and South & Central Otago/Southland are the two leading areas for honey production (in terms of quantity) followed by Waikato/King Country/Taupo, Bay of Plenty/Coromandel/Poverty Bay and Hawkes Bay/Taranaki/Manawatu/Wairarapa. The national average production per hive has remained reasonably constant since 1973 (since regular statistics have been available) (Figure 4). Considerable fluctuations from year to year over this 27 year period have been largely due to varying climatic conditions. Available data suggest that the average amount of honey produced/hive is similar in the different regions throughout the country, with a tendency for the Canterbury/North Otago area to have higher levels of production. For example, the 10 year average (1990-1999) for kg honey/hive for the seven regions is shown in Table 1. These figures combine the 16 regional branches of the NBA, and it is possible that they may overlook differences in production levels among branches and across years, however branch data are not collated. This is particularly pertinent given local variability within some areas, shaping what can be produced by beekeepers and how they go about securing productivity from their hives. A 'good' year in one 'region' may be a 'bad' year in another region, and such occurrences are disguised when figures are averaged.

Table 1. Average Honey Production (kg/hive) by Region (1990-1999)

Region	Average kg Honey/Hive
Northland/Auckland/Hauraki Plains	27.3
Waikato/King Country/Taupo	28.0
Bay of Plenty/Coromandel/Poverty Bay	25.3
Hawkes Bay/Taranaki/Manawatu/Wairarapa	29.4
Marlborough/Nelson/Westland	25.2
Canterbury/North Otago	35.0
South and Central Otago/Southland	29.9

Honey competes with a number of other spreads on the domestic market. The value of supermarket honey sales compared with four other spreads are shown in Figure 5 (A.C. Nielson, October 1999). Data are given for the last two years to October 1999. The supermarket sales value of

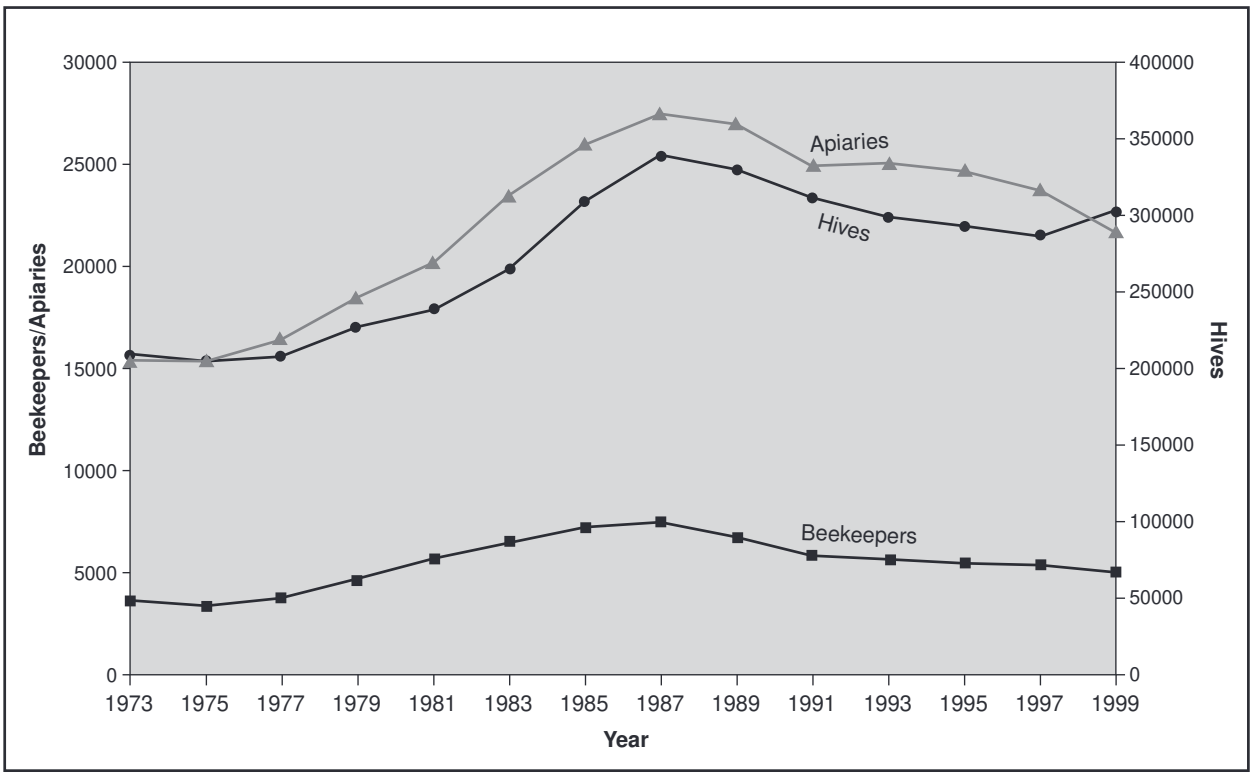

Figure 2. Numbers of beekeepers, hives and apiaries 1973-1999

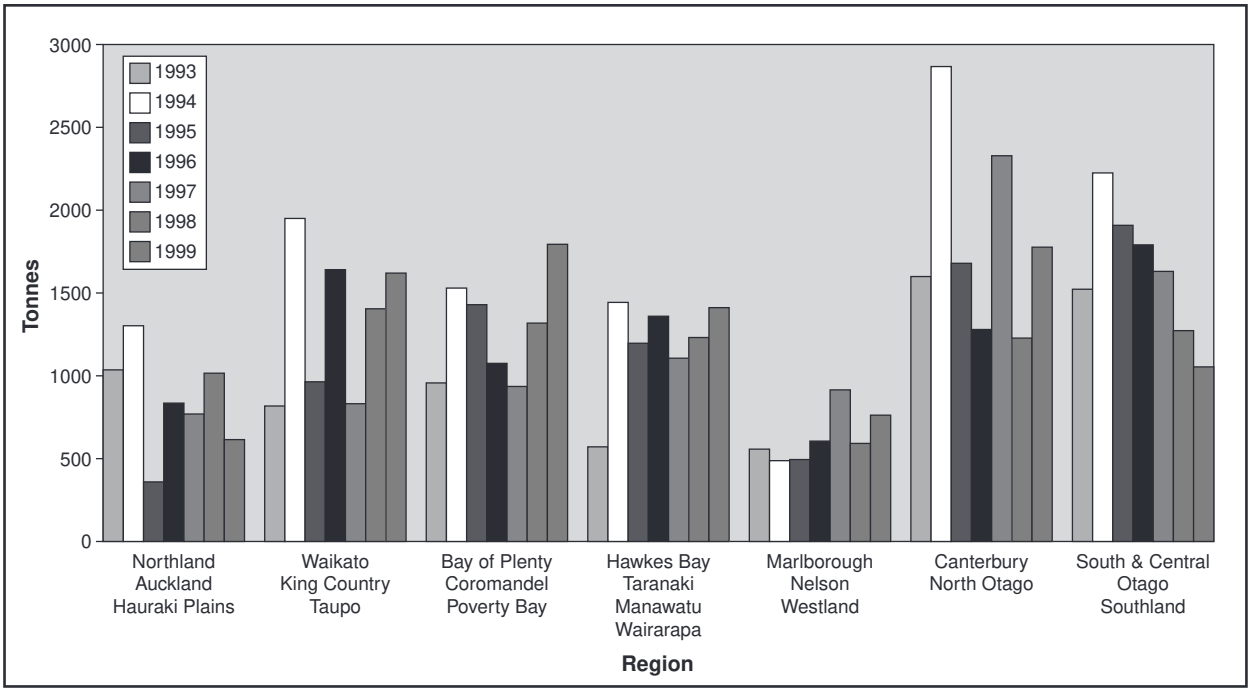

Figure 3. NZ honey production by region 1993-1999

honey is approximately 25% of the total value of the spread market (including vegetable and yeast extracts, peanut butter, honey, marmalade and jam). Of the five spreads, only supermarket jam sales have increased in the last year (Figure 5). The frequency of use of these spreads by New Zealanders has recently been reported in the 1997 National Nutrition Survey (Russell et al, 1999). Unfortunately, honey was grouped with jam, marmalade and syrups. However, 70% of males claimed to use jam, honey, marmalade and/or syrup as a spread at least once a week, 48% of males claimed to use vegemite/marmite at least once a week and 40% of males said they used peanut butter at least once per week. The corresponding data for females were 62% (jam, honey, marmalade and/or syrup), 57% (vegemite/marmite) and 31% (peanut butter) respectively. These trends are reflected in the kg sale data for the five spreads which also suggest that

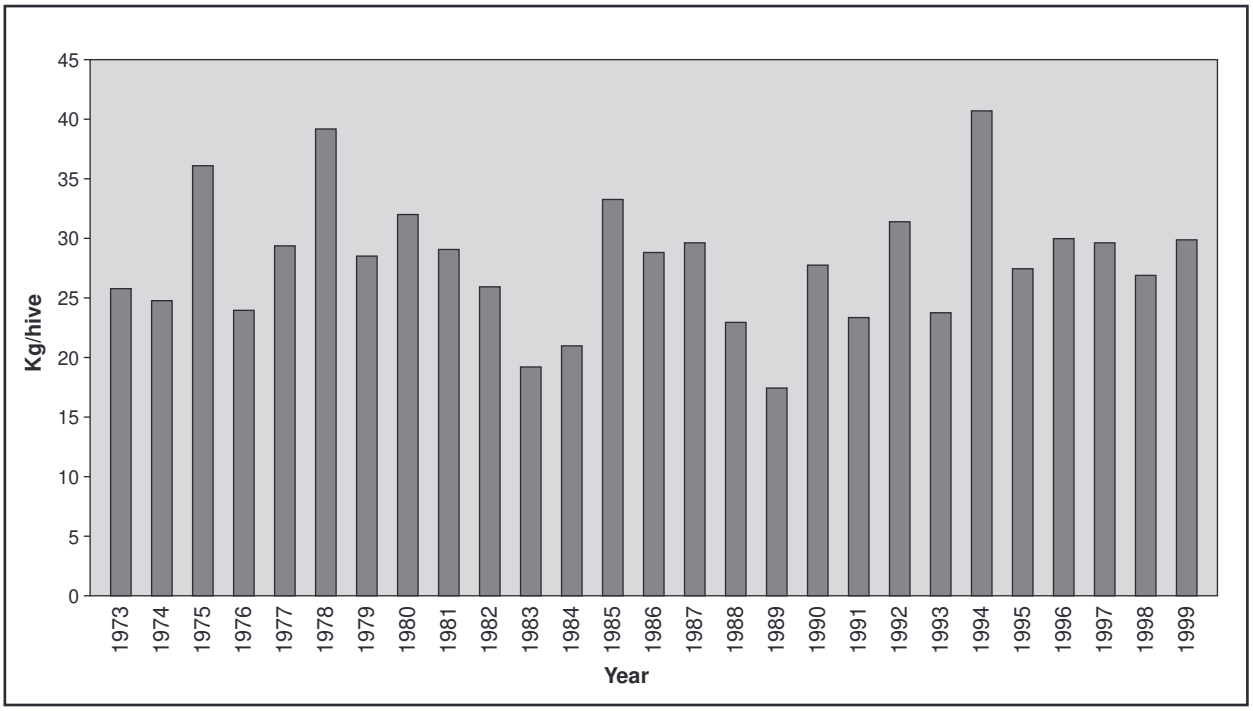

Figure 4. National average honey production 1973-1999

vegemite/marmite is likely to be the most popular spread followed by jam, since far less vegemite/marmite (by weight per serving) is used than other spreads (Figure 5). Older age groups (45 years and over) are more likely to use the sweet spreads, younger age groups (15-44 years) are more likely to use peanut butter while vegemite/marmite is used by a similar percentage of the population across all age groups (Russell et al, 1999). Consequently, there could be an opportunity to increase sales of honey to the younger age groups, particularly young females (15-24 yrs).

Supermarket honey sales data recently published in *The NZ Beekeeper* (Sept 1999) indicate that over the last couple of years supermarket sales have stayed fairly constant after a significant increase from 1993-1997. (Note that only approximately 30-40% of honey sold within NZ is sold via the supermarkets). The sales of manuka honey via supermarkets (the product earning the most in total dollar value) have also been constant over the last two years. The other two products gaining a significant market share are clover honey and clover blends as has been the trend for a number of years. One notable decrease from July 1 1998 to June 30 1999 has been in the supermarket sales of comb honey (from $112,411 to $46,732).

2.2.1 Honey Exports

The bulk of honey produced in New Zealand tends to be sold on the domestic market, with exports comprising honeys surplus to local requirements. This is because imports of honey into New Zealand are excluded from countries with a high disease incidence or with diseases not found in New Zealand. The only imports permitted into New Zealand are from Pacific countries, such as Niue, Samoa, Solomon Islands, Tonga, and Tuvalu and Pitcairn Island. These countries are relatively disease free, and, in most cases, their honey industries have been established through the introduction of New Zealand bees. At present, approximately 20% of the total honey crop produced each season is exported overseas. Over the last three years, Germany and the UK have been the main export destinations for bulk honey, and Japan and the UK for comb honey. Japan, Singapore, Malaysia, Hong Kong, Germany (and other EU countries), USA, and Taiwan have been significant importers of retail packed honey (Table 2).

The total export value of the four groups of products included in Table 2 was about $11M in 1996 which decreased to approximately $8M in 1997 and 1998. This decrease is mainly attributable to the decline in value and quantity of bulk and comb honey exports. In both 1998 and 1999 some regions in NZ were severely affected by drought which would have affected total production and exports. In 1998, there was a significant increase in the amount of honeydew exported to Germany and Belgium as reflected in the figures for 'other honey' in Table 2. The value of the export retail honey market has increased slightly over this three year period, while the quantity exported has been fairly constant.

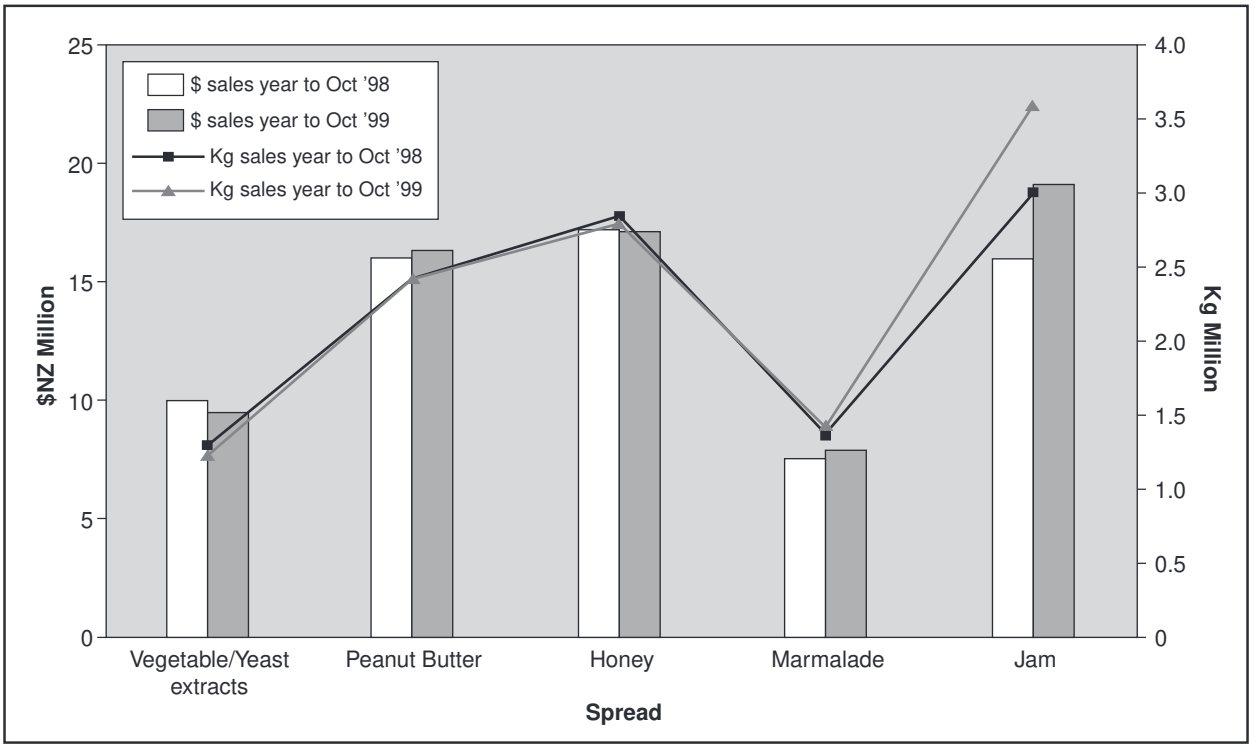

Figure 5. Value and quantity of spreads (supermarket sales from year ending Oct '98 to year ending Oct '99)

Table 2. NZ Honey Exports 1996-1998 (F.O.B) $NZ

Honey Type	Country	Year Ended Dec '96	Year Ended Dec '97	Year Ended Dec '98
Bulk Honey	Germany	3,236,957	1,581,438	1,085,426
	United Kingdom	452,959	585,343	895,102
	Singapore	435,400	171,076	375,806
	Malaysia	363,019	425,667	33,280
	Netherlands	342,648	139,643	103,137
	USA	314,620	131	8044
	Japan	285,209	141,472	215,035
	Denmark	150,718	74,096	-
	Total Other Countries	270,212	262,619	103,929
	Total All Countries	5,923,771	3,381,485	2,819,759
	Total Quantity (kg)	2,031,262	1,026,350	880,443
Retail Packed	Japan	397,502	415,264	200,877
Honey	Hong Kong	308,258	691,198	1,095,599
	Singapore	280,587	413,190	481,394
	Switzerland	228,975	33,732	69,586
	Saudi Arabia	190,519	11,812	45,263
	Malaysia	161,218	124,512	149,116
	Austria	135,482	71,451	-
	USA	134,282	290,588	254,649
	Taiwan	129,957	84,534	56,179
	Lebanon	116,462	93,232	-
	Australia	43,304	45,180	95,752
	United Arab Emirates	7626	33,743	97,785
	Total Other Countries	198,007	161,121	249,399
	Total All Countries	2,332,179	2,469,557	2,795,599
	Total Quantity (kg)	482,805	454,602	488,490
Comb Honey	Japan	1,488,210	1,281,791	847,929
	UK	525,990	227,579	199,026
	Germany	297,042	1080	115,704
	Yemen	117,358	-	-
	Hong Kong	33,150	130,992	109,842
	USA	25,635	24,214	193,222
	Total Other Countries	129,187	53,974	35,487
	Total All Countries	2,616,572	1,717,470	1,501,201
	Total Quantity	257,983	137,771	152,278
Other Honey	Germany	412,067	52,981	662,721
(incl. Honey-dew)	Korea	290,300	110,371	-
	UK	17,385	19,835	106,609
	Japan	18,486	22,853	52,026
	Singapore	6376	20,023	36,964
	Belgium	-	61,101	111,766
	Total Other Countries	94,245	95,986	16,146
	Total All Countries	523,612	383,150	986,232
	Total Quantity (kg)	223,858	78,136	314,468
	TOTAL EXPORT VALUE	11,396,134	7,951,662	8,102,791

2.3 The Current Political Structure of the New Zealand Industry

The New Zealand honey industry is presently co-ordinated by the National Beekeepers' Association (NBA). This association has a colourful history of attempting to resolve persistent issues that have arisen in the New Zealand honey industry. The NBA is presently grappling with the immersion of industry members in the global marketplace. Newton (1999) argues that the multiple interests and activities of members result in many participants hedging their bets in the competitive environment, causing a changing support base for the way the national association is being run.

2.3.1 The National Beekeepers Association

The NBA represents the interests of an increasingly diverse membership in negotiations with government and other regulatory bodies, and attempts to co-ordinate national action in beekeeping, such as disease control and marketing. It presently comprises a national executive of six elected members, and represents sixteen regional branches (eight in each island). Individual executive members stand

down by rotation after two years in office, and are eligible for re-election. Elections for the North Island and South Island positions take place every second year respectively, although a shortage of nominations often means no election takes place and those nominated automatically assume office. The positions are voluntary and unpaid, and tend to be fulfilled by those who can expend the necessary time. This often means Executive members either have relatively large beekeeping operations and recruit a number of employees to do beekeeping work, or actually own very few hives and possess different sets of skills to producers, such as, marketing and/or administration. Beekeepers like to see fellow beekeepers on the executive, although they often admit that these members may not always have the necessary managerial and administrative skills. In practice there is a high turnover of members on the Executive.

The rules of the NBA provide for five categories of membership: *Ordinary* members may own up to 10 hives on less than three apiary sites or are persons who may only subscribe to the industry journal. *Commercial* members are producers owning more than ten hives on three or more apiaries, and who are obliged to pay a graduated levy on their apiary holdings. There are also *associate* memberships for specialist beekeeping organisations; *honorary* memberships bestowed as 'marks of esteem' and in 'recognition of services to the New Zealand beekeeping industry'; and *life* memberships conferred on individuals to formalise the respect and social standing they have in the eyes of others.

At the time of writing, there was considerable debate and discontent being expressed by some members over the processes used by the Executive to appoint Federated Farmers as a temporary administrator for the organization. This followed the resignation of the Executive Secretary in October 1999, the only full-time paid position within the NBA. Two members of the Executive also have recently resigned, one at the beginning of his term of office, apparently due to conflicts in administrative styles and over decision-making processes and outcomes. There have been calls for a Special Meeting by some members to discuss and resolve some key issues, one being the financial management of the NBA. Much of the turmoil within the organization arises because of the individualistic nature of many members and the differing visions members have for the organization, with some believing that a more professional open management style is required, while others are content with continuing the established management structures.

2.3.2 NBA Sub-committees and Regional Branches

The NBA Executive has established a number of sub-committees, such as, the Pest Management Strategy Review sub-committee, the Marketing sub-committee, the Exotic Disease Investigation Committee, and the Publications sub-committee. These are specialist entities that make recommendations to the Executive. In practice, relations between the executive and the sub-committees it creates are a source of conflict in the industry. It is alleged by certain sub-committee members that 'the Executive' at times acts unilaterally and in disregard of their activities and recommendations. The relationship is ambiguous because membership overlaps. Executive members tend to occupy positions on at least one sub-committee consistent with their designated area or areas of expertise. Some industry participants see the value of sub-committees in providing continuity and consistency in policy initiatives and they advocate increased responsibility and influence of sub-committees (Newton, 1999:101-103). However, membership on these committees may be no more stable than membership to 'the Executive' itself. While there appears to be no restriction on members serving successive years, in actuality, there is a lot of juggling for positions. Membership is often deployed as a strategy by particular industry participants to assume or conserve central positions in beekeeping in accord with their own interests and needs.

Industry participants are able to participate in the administration of beekeeping through their regional branch. Producers, packers, marketers, pollinators, exporters, and executive members attend branch activities. Branch members get together regularly not only for formal meetings, but also for field-days and other events which promote their collective interests. Remits are produced every year in the lead up to National Conference in July, as statements of recommendation to the executive. The remits are intended to convey 'grassroots feelings' on a range of issues for the benefit of the national body. It is thought that branch remits encapsulate local idiosyncrasies of beekeeping in specific areas. The branch structure in beekeeping is, therefore, considered crucial by industry participants due to regional variability in beekeeping practice.

The sixteen regional branches differ in size, proportions of 'ordinary' and 'commercial' members, and composition of *producers* and *packers,* reflecting the local environments where members keep their bees. Consequently, the nature of 'the business' discussed, and levels of participation by individual members are determined by the networks they are positioned in. For example, some branches may have members who are packers and

marketers actively participating on national sub-committees. These members therefore strongly influence the development of regional knowledge in branch meetings which may be expressed through branch remits (Newton, 1999). Other branches, by comparison, may be dominated by commercial producers who are less actively involved in national activities, and whose interests lie primarily in producing honey and managing healthy beehives. These people often form local groups in their specific areas which exist interdependently of the Branch.

2.3.3 Informal Networks and Sub-Groups in Local Areas

Beekeepers in local areas perceive common concerns and ways of beekeeping, and form groups to promote their collective interests. These function as informal support networks for negotiating aspects of the craft of beekeeping in their particular area. They often precipitate more formal ties between members, and bolster existing Branch structures by allowing beekeepers who do not participate in formal structures to maintain links with other beekeepers for information and informal input into the NBA.

A lack of continuity of members on 'the Executive', and tension between sub-committees, regional branches and sub-regional local groups, exacerbates barriers to industry co-ordination. Policy initiatives are often frustrated because of unforeseen contingencies and local idiosyncrasies derailing planned strategies and goals. Accountability in beekeeping is fragile, and the nature of beekeeping work itself is such that it is virtually impossible to regulate what beekeepers do out in the field. This is especially the case where locally-embedded beekeepers do not directly participate in formal industry structures, affording them maximum room to do their own thing. This can however, have both positive and negative consequences. Given the trend towards decreasing the prescriptiveness of New Zealand food laws, it is likely that many industry participants will tailor their products to the specific requirements of buyers in importing countries and contest the development of national standards.

One highly significant development in the beekeeping industry is the emergence of Information Communication Technologies (ICTs) as a medium of communication among members of the industry. This is significant in beekeeping because geographical barriers have often acted as barriers to communications among industry participants. A beekeeping homepage and the initial electronic-mail distribution list were established in the latter half of 1997 by a past President of the Association. This was a personal initiative on his part making use of his computing skills. The beekeeping homepage is still not officially recognised by the Executive, although previous and current members of the Executive subscribe to the distribution lists. The initial list, the 'NZBkprs' list, was divided approximately one year after its establishment to reflect different patterns of use by subscribers. It now contains postings specific to the practice of beekeeping and has approximately 150 subscribers (October 1999). The new list, the 'NBA' list (with 76 subscribers as of October 1999), is only open to members of the NBA. The NBA is only slowly embracing ICTs in order to communicate with members and to co-ordinate its various activities.

Most of the original subscribers on the 'NZBkprs' list were 'public' participants, like Apicultural Advisory Officers and research scientists. The list has enabled these people to communicate more directly and frequently with local beekeepers, and their active participation goes some way to altering the nature of science/craft interests and public/private relations as previously experienced by industry participants (Newton, 1999:171-172). Commercial producers have been less enthusiastic in the uptake of computer technologies. They are less likely to own computers, and have limited time to spend using a computer. Consequently, the effectiveness of ICTs as a form of communication in beekeeping are limited because they exclude participants who do not have access to computers, thus preserving the need for traditional and parallel forms of communication. Moreover, it is unlikely that computer technologies will displace face-to-face fora like National Conference and regional Branch meetings (Newton, 1999).

2.3.4 The NBA National Conference

National Conferences of the NBA are held alternatively at North and South Island venues and given the tensions and suspicions between branches and the Executive, as well as the Executive and the sub-committees, this provides the one formal opportunity where co-ordinated industry planning can take place. In recent times however, often strong opposing views have prevented much progress from being made.

Conferences are held over four days, and comprise a series of fora for different members and industry groups to assemble face-to-face and pursue multiple interests. For instance, a number of specialist associations have formed over the years and presently schedule their Annual Meetings to coincide with Conference. The associations are purportedly independent of the NBA, yet recruit their members from the NBA membership. They include the Comb Honey Producers Association; the Queen Bee Producers Association; the Exporters' Association; and the Honey Packers' Association. The Exporters' Association is now defunct, having been superseded in 1998 by the Honey

Exporters' Joint Action Group (JAG) instigated by Tradenz (now Trade New Zealand). The Honey Packers' Association was established in 1968 to reflect the disparate and, at times, conflicting interests of honey packers in relation to producers.

The National Conference also includes a day of seminar presentations which provides an opportunity for NBA members, government officers, research scientists, food technologists, and marketers to communicate their work directly to beekeepers.

Days three and four of National Conference are devoted to the Annual General Meeting of the NBA and 'the Conference of Branch delegates'. The Conference of Branch delegates provides the context in which remits prepared by Branches are deliberated and voted on by Branch delegates, elected Branch members. At one time, voting was taken on an attendance only basis so that members who did not attend Conference had little voting entitlement (Dick, 1972: 30). This was seen to create problems because most attendees came from surrounding areas. Thus, Conference was perceived as unrepresentative of 'the membership'. The present remit based system and the role of Branch delegates were instigated by a Government Caucus Committee Report published in 1972.

2.3.5 The Commodity Levy of the NBA

One of the most contentious aspects of the current structure of the industry is the NBA's commodity levy. The levy is considered by many to be essential for underwriting co-ordinated strategies for the national industry while being bitterly opposed by many other beekeepers. Issues and problems surrounding the levy reflect the difficulties of attaining a 'fair' levy system in an industry increasingly marked by heterogeneity of interests. There are on-going discussions concerning the levy and it is likely that new proposals will emerge in the future.

The system for calculating levies payable to the NBA has recently been changed from the number of hives owned by beekeepers to the number of apiaries managed. 1997 was the first year the levy was calculated and collected under the new system, which was empowered by the Bee Products Commodity Levies Order 1996, pursuant to the Commodity Levies Act 1990. *Commercial* operators, that is, those beekeepers owning more than 10 hives on three or more apiary sites, are obliged to pay the commodity levy. The threshold for commercial production was previously set at 50 hives under the Hive Levy Act 1978. Now, beekeepers owning considerably fewer hives are compelled to pay a levy to the Association. The apiary-based levy system is a contentious issue because beekeepers in some regions have experienced marked increases in their levies, while beekeepers in others regions owning similar hive numbers are now paying less. In Canterbury, for example, beekeepers run more smaller apiaries as strategies to avoid other beekeepers taking over their traditional sites. In contrast, beekeepers in the Waikato region tend to manage more hives per apiary.

The Commodity Levy Order was devised by the Executive to effect a more equitable system by which levies could be extracted from members. Its timing was crucial because it coincided with plans for a National Pest Management Strategy (PMS) for American Foulbrood. A levy system was needed to guarantee funding for the development and implementation of this strategy, although there have been calls within the industry more recently to separate the funding of the PMS from the NBA levy. The previous system, based on hive numbers, was considered problematic because it was difficult to verify the number of hives actually possessed by individual beekeepers, and, thereby, identify defaulters. Thus, the apiary-based commodity levy is an attempt to create more certain income for the NBA.

From Government's point of view, the Commodity Levies Act 1990 was an attempt to foster private funding for scientific research and development in primary industry in line with other OECD countries. It purportedly provides a means by which 'primary industries' can enjoy *certainty* of funding (NZ Parliamentary Debates, 1995, Vol. 551:10521). The Act was also designed to foster accountability for primary industries in terms of removing the problem of free-riders, that is, individuals who were seen to benefit from the activities of industry bodies without contributing financially to those activities. However, in the honey industry, discontentment with the new levy has eroded accountability by fuelling counter-strategies on the part of producers in order to minimise and evade levy payments. Consequently, the process of collecting levies has been rendered more precarious for executive members, and has unexpectedly resulted in decreased levy intakes. This also has ramifications for funding the implementation of industry initiatives like a national PMS (section 4.2). Furthermore, the legislative intent of the Commodity Levies Act, to encourage greater private investment in research, product promotion, and market development, has been frustrated. Particular people in the industry are rigorously contesting the generic marketing activities of 'the Association' which are funded out of the levy.

2.4 Attempts to Co-ordinate Marketing in the Industry

The current discontents among many beekeepers with the activities of the NBA can only be understood in the context of the longer history of the honey industry in New Zealand. There has been a succession of marketing organisations since the l910s ranging from government departments, producer associations, and statutory bodies. These entities sought to co-ordinate local and export markets for honey by juggling supply and demand on the domestic market. Exports have always comprised honeys surplus to domestic requirements as a mechanism to avoid a glut on the local market. While the marketing bodies existed independently of the NBA, membership of the organisations invariably overlapped. The NBA is now equated by producers with being 'the industry' itself. However, it was only in the mid 1980s that the NBA officially assumed a marketing mandate, and it is currently playing out many of the issues and problems encountered by its predecessor organisations within the current 'free-trade' environment.

The various marketing schemes instigated by marketing organisations, like the Internal Marketing Division (IMD) during World War Two, and its successor, the Honey Marketing Authority (HMA) from the l950s to the early 1980s, were primarily intended to stabilise prices for commercial producers across good and bad seasons (Dick, 1972: 11). The IMD was the first organisation to institute a 'system of pooling returns from local and overseas sales and paying for supplied honey according to quantity' (Dick, 1972: 11). Prior to its formation, domestic and overseas sales of honey had not been co-ordinated by a single agency. The marketing schemes also embodied attempts to assure continuity of supply for overseas buyers in order to secure goodwill, and, consequently, guaranteed markets. Honey grading was deemed necessary because buyers ordered by grade and expected consistency. It was as early as 1914 that the first honey grading regulations were formed, making grading compulsory for producers and packers wanting to export.

2.4.1 The Internal Marketing Division

The Export Honey Control Board was created in 1925 by the Massey Government to promote 'orderly marketing' of honey exported overseas, although 80% of honey was actually being distributed on the local market at that time. During World War Two, a special section of the IMD of the Department of Industry and Commerce assumed the trading functions of the Board in order to satisfy war-time requirements for honey. Sugar was rationed during the war, boosting demand for honey both domestically and overseas.

The IMD sought to compel producers to supply the bulk of their honey crops to the IMD in order to co-ordinate both local and export sales of honey. To this end, it imposed a seals levy on honey being sold in New Zealand by producers and packers outside of the IMD as an incentive to supply the IMD with product to sell. This levy applied to extracted honey produced by producers owning 20 or more hives but various exemptions meant that less than 50% of honey produced was acquired by the IMD.

The activities of the IMD were perceived unfavourably by producers opposed to control in marketing and these reactions varied by region. Support for the Division was more consistent amongst producers in the North Island, especially those keeping bees in the Auckland and Waikato regions. At the time, half of the total crop was being produced in Auckland, and two-thirds came from the North Island (Wallingford, unpublished :44). The Division was seen as a guaranteed outlet by North Island producers for their darker honeys. However, for South Island producers, like those in the Canterbury region, the activities of the Division were seen as prohibitive. Hence, the operations of the IMD intensified opposition against control in marketing, polarising the different branches of the NBA, like Auckland, Waikato and Canterbury. This served to reinforce regional variability in beekeeping and to highlight the difficulties of meeting the needs of members attuned to local conditions. The pay-out prices of the IMD were always a source of contention for participants in the industry, especially members of the NBA. Producers were constantly reminded by government to average out their returns across a number of years before complaining that prices being received in any one year were too low.

2.4.2 The Honey Marketing Authority

The Internal Marketing Division was disbanded following the end of the war. Despite the widespread opposition to the IMD it was still considered necessary by most industry participants to have some sort of marketing entity in the industry. This entity could continue to organise sales of honey domestically and overseas, but without the prior element of control and compulsion. When the Primary Products Marketing Act 1953 was passed - in line with Government's general trade policy to encourage the marketing of primary products - it allowed for the establishment of a Honey Marketing Authority (HMA) under the Honey Marketing Authority Regulations 1953 and was supported by a majority of the NBA. The HMA acted to supply both the local and overseas market and it kept tight control on exporting activity for nearly 20 years. It was not until the early 1970s that private exports of honey were first allowed. A Government Caucus Committee had resolved in

1972 that the Authority 'should not...continue to be the sole arbiter of who should export honey' (Dick, 1972: 27).

While not requiring compulsory acquisition of producers' crops, the HMA continued a seals levy on all honey not sold to it, which, in effect, compelled industry participants with an economic and financial interest in maintaining stability in the marketing of extracted honey to contribute to the Authority's activities (Dick, 1972: 27). Honey received from producers was inspected, graded and packed by the HMA in order to differentiate brands and guarantee consistency, as well as to determine advance pay-outs for suppliers. The Authority operated three blending plants (Auckland, Pleasant Point, Hornby), and during the 1960s, distributed honey on the local market under two brands: 'Imperial Bee' ('extra light amber' honey), and the 'Honeygold' brand ('light amber' honey). White clover honey, considered of superior quality, was exported and, consequently, not marketed locally (Bale, 1967:56).

Hence, the HMA was seen to bring about 'standardised' products on both the local and overseas markets. It had the financial capacity to undertake industry-wide promotion and to inject a level of stability in prices being obtained by producers (Bale, 1967: 31). During the l950s and first half of the 1960s, it was also associated with improving the bargaining power of beekeepers vis-a-vis government officers. However, its reputation plummeted during the later half of the 1960s when domestic prices, which had previously been determined by export prices, exceeded export prices. Price controls on honey had been removed in 1965, paving the way for private packers to pay prices slightly above what they estimated would be the Authority's pay-out (Dick, 1972: 19-20).

In response to rising domestic prices the HMA diverted more of its honey into the local market, and access to overseas markets became easier for private honey producers. In 1957, the English firm, Kimpton Bros (Red Carnation) Limited, had been given sole agency to distribute New Zealand honey into the United Kingdom through a contractual agreement with the HMA. It was not considered financially feasible by the Authority for the industry to promote its own honey, even though some producers disapproved of having a 'middle-man'. The United Kingdom remained the significant outlet for honey until the 1970s when alternative markets like Japan and the USA emerged (Dick, 1972:15). Sales of honey to Japan surpassed sales of honey distributed to both the United Kingdom and Europe combined during the latter half of the 1970s (Honey Marketing Authority Annual Report, 1979). The availability of different markets, including Australia, Malaysia and Hong Kong, allowed the development of private exports in the mid 1970s. Basically, the HMA lost its monopoly over the export market while still enforcing particular grading standards for the industry. Consequently, the Authority began to slowly lose its ability to co-ordinate industry activities.

The decline of Honey Marketing Authority also polarised the interests and needs of producers and producer/packers. The HMA had high overhead costs and depended on governments of the day for overdraft facilities and loans. There were often long delays before final pay-outs could be made to suppliers. While the HMA's costs might have been similar to the other Marketing Authorities, they were often seen by both government and industry participants as being out of proportion to the size of the industry. Moreover, there was pressure from government officials for the HMA to become self-sufficient.

When the Authority was disbanded in 1982-3, the industry became relatively fragmented. In the years leading up to its demise, industry participants had been divided over whether to retain the HMA, to have an alternative marketing structure without centralised control, or to create producer co-operatives (Jackson, 1981: 24). After 1983, a number of issues emerged which have a strong bearing on the current difficulties facing industry bodies. The number of packers for the domestic market increased, rendering quality control and brand differentiation problematic in terms developing and enforcing a single set of guidelines for honey grading (Jackson, 1981:58). The New Zealand Honey Co-operative (NZHC) was later established in 1983 and attempted to fulfil similar functions to the HMA. However, as a producers' co-operative, whose members are shareholders, the Co-operative does not enjoy the financial support furnished by government to its predecessors, although it initially received some funds generated from the HMA's assets. The Co-operative took over the HMA's three processing facilities, although has since closed down two plants, those in Auckland and Hornby.

2.4.3 The NBA and Honey Marketing

During this phase of industry fragmentation, and given the failure of the NZHC's attempt to co-ordinate industry activities, the National Beekeepers' Association emerged as the only vehicle remaining which could unite the divergent interests of the industry. Even before the marketing entities were disbanded, there was conflict over the NBA's relationship with these organisations. There was also disagreement as to how well it was supported by, and representative of, producers in the industry. The actions of certain regional branches unilaterally pursuing and enforcing the *local* interests of members through directly campaigning the IMD or the HMA, undermined the role and purpose of the

Executive of the NBA. This detracted from the authority and credibility of the Executive when attempting to act in the *national* interest.

While the NBA received a small amount each year from the HMA out of seals levy collections, the financial relationship between the two did not cease when the HMA was disbanded. In June 1983, two trust funds were established out of proceeds from the dissolution of the HMA. The trust funds provide a substantial source of revenue for the industry, including the NBA. The interest accrued from the principal sums is currently used to fund various research activities and to assist the NBA to meet expenses which are unexpected, and/or vital to the industry's well-being. For example, in 1998 money was apportioned to the Honey Research Unit at Waikato University and to a scientist from HortResearch, and a one-off payment was received by the NBA in order to meet costs associated with implementing the National Pest Management Strategy. In addition, one of three applications received by trustees for research projects in 1999, was approved.

Clearly, the NBA inherited an industry characterised by fundamental ambivalence and/or conflict over the need and extent of centralised planning for marketing and other industry functions. The strategies of the NBA tried to reconcile the opposing forces of individualism and co-ordinated planning. Initially, a marketing sub-committee of the NBA was established in the mid 1980s and a proportion of the commodity levy has been devoted to marketing since the 1992-3 season (Chai Fang et al., 1993: 17). In 1992, the Association also recruited a generic marketing consultant to produce a marketing plan for producers in order to promote the sale of honey and bee products on the domestic market. The appointment of the marketing consultant was contested by some producers, and this is not surprising given the antagonism displayed to controlled marketing under the IMD and the HMA. Industry participants in certain areas do not perceive direct benefits accruing to them as a result of generic marketing activities, and prefer to do their own marketing. Some of those producers who mainly export their honey believe that the marketing consultant focuses primarily on the domestic market and therefore they do not reap any benefits from the consultants activities despite contributing financially. These producers would prefer their money went directly to fund research as opposed to generic marketing activities. There are also concerns on the part of commercial beekeepers in general, that the marketing sub-committee is not sufficiently representative of their interests. It is seen to be captured by dominant 'packers' and 'brands'. Such suspicions epitomise the difficulties faced by the national Executive trying to secure consensus among a cross-section of industry participants.

Under the auspices of the *New Zealand Honey and Food Ingredient Advisory Service* (NZHFIAS), the marketing consultant has a close working relationship with members of the marketing sub-committee. He sees his task as creating research ideas, and disseminating research findings, on behalf of industry participants, thereby generating opportunities in the competitive marketplace. To this end, he is Manager of a Honey Research Unit at Waikato University and works towards allowing 'the industry', through the marketing committee, to control the development and implementation of the Marketing Plan. The Marketing Plan was published in 1993 out of collective efforts of the Marketing sub-committee and the marketing consultant. It is revised regularly and attempts to reconcile a free-trade environment with co-ordinated activity. The marketing mission is to reward 'innovation' and a 'commitment to quality' on the part of individual industry members. It is also intended:

> '...to create a commercial environment that is healthy and competitive; where individual members of the honey industry succeed or fail by their own effort.'
> (Industry Marketing Plan, 1993:22-23).

The Marketing Plan eventuated out of a 'SWOT' analysis undertaken by members of the Marketing sub-committee, and the marketing consultant. A 'clean, green' image and producing organic honey were identified as strengths, and it was considered necessary to present New Zealand beekeeping as an 'established, traditional, financially sound rural activity' with a competitive advantage based on the industry's disease free status (Industry Marketing Plan, 1993: 23). Weaknesses were identified as including lack of industry standards and product misconceptions. There were seen to be opportunities for industry co-ordination and expansion of the domestic and export markets, whereas diminishing floral sources and chemical contamination were, for example, recognised as threats to the industry. These issues do represent a threat to the on-going prosperity of the industry and Chapter 4 examines the way in which attempts to develop co-ordinated strategies for pest control, risk management and varietal standards have emerged.

2.5 Other Institutional Participants in the Industry

While the previous sections have reviewed the political structure of the industry, there are other participants in the industry that deserve some mention - namely, government officers and the research sector.

2.5.1 MAF's Participation in the Honey Industry

The history of beekeeping in New Zealand reveals an active involvement of government officers. This is due not simply to the industry's reliance on disease control measures, but to the nature of beekeeping work itself. Government employees have often themselves been beekeepers and performed extension roles for the industry. On a more formal level, MAF has traditionally provided a range of services to the industry. These services were carried out by a team of Apicultural Advisory Officers (AAO's), and included consultancy and advisory services, the co-ordination of disease control measures prescribed by the Apiaries Act 1969, disease surveillance, border protection activities, and export certification.

The Government is currently reworking its role in beekeeping, and, as with other primary industries, is seeking to recover costs for services performed. Since 1992, the new fractions of the old MAF structure have maintained various activities for the honey industry. MAF Regulatory Authority still develops policy in relation to honey exporting. It has also been responsible for negotiating access of live bees and bee products into overseas markets, performing risk analyses for potential imports of overseas honey and carrying out honey testing for the EU monitoring programme. MAF Quality Management continued for awhile to provide the services of AAO's, however, the number of AAO's has gradually been reduced over the years to one full-time officer and six multiskilled officers. In 1998, the further restructuring of MAF has seen these functions incorporated on a cost recovery basis to the state-owned enterprise AgriQuality New Zealand. Its role is to provide testing, analysis and quality assurance systems for animal, plant and food products in order to maximise the quality of products being produced by industry participants for chosen markets.

Government involvement in beekeeping has, nevertheless, been highly contentious. There have always been industry participants strongly opposed to government 'interference' and who have been openly anti-MAF. Having government involved in organising beekeeping is seen to infringe the individualist, do-it-yourself rhetoric of some industry participants. It is also seen to impose extra costs and to increase levies payable to the NBA. However, services like disease surveillance and border protection are recognised by many industry participants as being tasks that only the government is capable of administering.

2.5.2 Honey Research

Despite being a small industry, the honey industry is supported by one designated research unit. The Honey Research Unit (HRU) is sited at the University of Waikato. The Unit was formed in 1995, and had its first year of operation in 1996, although its two directors, Assoc. Prof. Peter Molan and Prof. Alister Wilkins, had been engaging in research involving honey, as well as supervising related student research, for a number of years. The HRU is partly funded by the New Zealand Honey Trust Funds. It is promoted by some members of the NBA as a valuable source of research ideas for producers and packers to act upon in order to get innovative products into the marketplace (New Zealand Honey Marketing Plan Review, 1997:1). The work of the research scientists is also seen as a way of educating customers and consumers alike of the beneficial nutritional and therapeutic effects of different honey varieties. A component of the NBA-appointed marketing consultant's work is, therefore, to publicise the research activities and findings of the Honey Research Unit. The consultant has recently helped secure a substantial level of funding for the Unit from the American National Honey Board.

The Apicultural Research Unit at Ruakura (HortResearch) has had a long and important association with the NZ beekeeping industry particularly in the areas of pollination, an important activity for many beekeepers, the control of American Foulbrood and the properties of manuka honey. In addition, more recently research into the effects of pesticide contaminants (e.g. surfactants) on bees, has become a topic of significant interest for the industry. Dr Mark Goodwin has been the Apicultural Scientist at Ruakura for 12 years.

Other NZ institutions involved in research on aspects of the beekeeping industry include Lincoln University, MAF BioSecurity Authority, HortResearch Auckland, Landcare Research, Industrial Research Ltd, Donovan Scientific Insect Research, University of Auckland and the University of Otago. Projects include a wide range of topics for example, bee immunization, impacts of genetically modified plants on bees, composition of pollen, wasp control and the bee brain.

Chapter 3

Organic Honey Production and Standards

3.1 Introduction

In other industry sectors being researched by this programme, there have been a range of attempts to 'green' food production. These range from certified organic production to systems based on Integrated Pest Management. Within the honey industry, however, there is already a strong perception that honey is a natural and environmentally friendly product. Consequently, there is only one alternative to mainstream honey production that self-consciously attempts to 'green' honey production. This is certified organic honey production. This chapter examines the differences between conventional and organic honey production, assesses the existing standards for organic honey production in New Zealand and compares these standards with alternative organic systems both locally and overseas.

There is only one organization in NZ which certifies the production of organic honey, Bio-Gro NZ. Currently the Bio-dynamic Farming and Gardening Association does not have any standards for honey though they would develop them if there was a demand. As of September 1 1999, there were 17 Bio-Gro honey licensees located throughout NZ. Of these, 7 are located in the Canterbury region. About half of the organic producers became licensees in the 1993-95 period and there have been few new producers obtaining Bio-Gro certification since 1997. Since the certification of land is not required for the certification of honey, it is relatively common for licensees to not apply for certification in years when they perhaps have poor crops or alternatively find acceptable non-organic markets. In 1992 when there was an increase in the number of organic honey producers, the premium gained was about 50%, however, currently the premium is more often 20-30%, although it can range from 0-30%. Several people involved in the industry have commented that organic beekeepers need to obtain $1/kg more for organic honey over conventional honey in order to have a viable business. No statistics on the quantity of organic honey produced have been collated, however it is estimated that on average about 300 - 350 tonnes of organic honey are produced annually (3% of total honey production).

3.2 Choosing to be an Organic Honey Producer

The most frequently stated reason for choosing to produce certified organic honey is the potential premium to be gained. In some cases beekeepers also believe that the environmental benefits of organic production are worthwhile however this is not a prime reason for seeking organic certification. Some beekeepers comment that the organic label serves to differentiate their products which is beneficial in the market place. Often organic honey producers initially need to put considerable effort into finding buyers but once contacts are established, it is not normally too difficult to sell organic honey on the export market. Only a very small amount of organic honey is sold on the local market.

Many beekeepers have considered organic honey production at some stage but discounted the possibility for a number of reasons including:

- too difficult with not being able to feed sugar (Interviews 6, 13)
- can't see too many problems with conventional honey, people think NZ honey is about the best in the world, my honey from the bush is as organic as any labelled product (Interviews 18, 22, 25)
- impossible to be at least 5km from spraying (Interviews 22, 24)
- too much hassle with the paperwork, and/or increased complications in dealing with landowners (Interviews 18, 21, 22, 25)
- standards require expensive changes in equipment (Interview 24)
- my main buyers would not be interested (Interview 24)
- only economic for small amounts, we are too big (Interviews 1, 4)
- doubt the reality of the premium (Interviews 5, 23)
- some requirements of the standards are unreasonable and commercially naive (Interviews 6, 13, 21, 26)
- more in favour of endpoint testing only (Interviews 13, 19)

Two points need to be made about this range of responses. Firstly, as those interviewed were not randomly selected, the frequencies of responses is less important than the range. Secondly, it is clear that some conventional beekeepers appear to have little knowledge of the Bio-Gro standards and have mistaken perceptions about what organic production requires. For example, some individuals

believe that the 5km radius around hives has to be totally free of pesticides. This lack of knowledge was also common among conventional producers in other horticultural sectors.

Management practices vary considerably throughout the country so it is likely that different beekeepers find different aspects of the standards the most challenging. Specifically, different regions - particularly those with intensive horticulture - are unsuited to organic production, and have few organic producers. However, it is important to note that in general terms, there is not a huge difference in the management practices of conventional and organic beekeepers, unlike differences in other sectors such as livestock, vegetables, and fruit production. In addition, organic beekeepers essentially have a 12 month conversion period not the 2-3 years that is required by most other organic licensees. (Hives that are brought in from uncertified sources are subject to a 12 month conversion period). Changes made that were considered to be most significant by the organic beekeepers include: not overheating the honey, not fine filtering, obtaining landuser statements, changing methods for taking the honey off, not using wood preservatives, not sugar feeding and the location of bees. Typically, however, an individual beekeeper would only mention two or three of these management practices as being significant in changing to organic honey production.

It is also pertinent to note that organic producers also frequently produce conventional honey. This places demands on the management of honey, through the necessity to operate separate systems of boxes, frames and other equipment. This places a management burden on organic producers that is not experienced by conventional producers.

3.3 Producer Concerns with the Bio-Gro Honey Standards

The Bio-Gro standards for organic honey production were formalized in 1991, however, prior to this a very small number of producers had been certified. The standards were developed further in the 1994 edition when the requirement of applicants providing landuser statements on pesticide use in the areas in which hives are situated, was included. In addition, statements regarding comb production and the use of hives for pollination were included at this time. Essentially only minor changes have been made since 1994, the most notable being the increase in temperature to which honey can be heated (from 35 - 38°C) and the apparent prohibition of locating hives within 1 km of any pesticide use (Bio-Gro NZ, 1998). Over the last 3-4 years there has been a general move by Bio-Gro NZ to require improved documentation of management plans, better maps showing hive location and more detailed landuser statements.

The key requirements of the Bio-Gro standards are:

1. Statements from all landusers within a 5km radius of each apiary site, which report all use of pesticides.
2. Hives not sited within lkm of any pesticide use.
3. Pesticide residue tests for honey.
4. Non-use of timber preservatives for hive boxes and non-use of chemicals to control weeds and pests around hives.
5. Prohibition of sugar feeding except in emergency situations.
6. No heating of honey above 38°C, however, if honey is destined for 'processing' use only, higher temperatures may be permitted.
7. Honey must not exceed the hydroxymethylfurfural (HMF) level of 8mg/kg and the 'apparent reducing sugar' content and the 'apparent sucrose content' must be 'satisfactory' ('satisfactory' not defined in the standards).

When Bio-Gro NZ started to develop the honey standards in 1989, Bio-Gro personnel consulted MAF and people in the honey industry. However, several people who were consulted at the time believe that Bio-Gro NZ went ahead with standards which were contrary to their advice and further did not have a sound scientific or logical basis (Interviews 5, 10, 17, 26). It has been suggested that the requirements of the Bio-Gro standard have been established to enable certified organic honey to be differentiated from conventional honey rather than the standards themselves solely reflecting the principles of organic production (Interviews 5, 6). It is also claimed that the standards are far beyond what the organic market is requiring (Interview 11). With the most recent review of the honey standards, in 1998, all interested parties were able to make submissions. However some who participated in this process believed that little notice was given to their submissions, a conclusion drawn on the basis that they did not personally receive any response from Bio-Gro NZ (Interviews 8, 17). Bio-Gro NZ is planning a more structured and comprehensive process for reviewing all of the standards and this is to commence late 1999. The process will provide the opportunity for interested parties to attend regional meetings and discuss aspects of the standards. Recently, a Bio-Gro honey producers group has been formed by the producers themselves and together they have formulated a submission on the Bio-Gro standards. This is a significant development amongst at least some of the producers in

terms of presenting an agreed submission to Bio-Gro NZ.

The following section summarizes the main comments made by those interviewed for each of the seven key requirements listed above.

1. Landuser Statements

Although obtaining the landuser statements can be extremely time consuming for some beekeepers who may have over 100 statements to collect annually, most understood the reasons for this requirement. In one case where hives are located in a valley and the distance between hives and the top of the mountains is about lkm, the beekeeper is still required to get statements from landusers within 3km over the other side of the mountains, an area where bees will not fly (Interview 11). The beekeeper believed there should be an opportunity to review this requirement in situations where there are geographical barriers. Several beekeepers commented that having to get the landuser statements has proved to be a good public relations exercise although at times some landusers have been reluctant to co-operate (Interviews 8, 11, 14).

2. Hives not sited within 1 km of any pesticide use

One beekeeper stated that this requirement was 'silly' as bees can fly up to 5km (Interview 8). In fact Bio-Gro NZ has decided not to enforce this particular part of the standards since at this time it would prevent many producers from gaining certification.

At the end of 1998 the International Federation of Organic Agricultural Movements (IFOAM) Basic Standards (with which Bio-Gro has to comply) were amended to read: 'Hives shall be situated in organically managed fields and/or wild natural areas. Hives shall not be placed close to fields or other areas where chemical pesticides and herbicides are used'. It is also stated that 'Exceptions can be made by certification bodies on a case by case basis'. It is Bio-Gro NZ's intention in the future to encourage beekeepers to site their hives on organic land/wild areas where possible. This will prove to be very difficult for many organic beekeepers, partly because the amount of 'wild' areas available is steadily decreasing (with the Department of Conservation managing some remaining areas with the use of chemicals that would render them unsuitable for Bio-Gro anyway). With the increased conversion of properties to organic management systems, over time it may become slightly easier for beekeepers to find suitable organic land for their hives. However Bio-Gro acknowledges that this is not immediately possible for all beekeepers and so allowance will be made for this (Interview 27). Currently Bio-Gro NZ requires that hives are located on extensively farmed land i.e. pastoral areas and bush areas. Intensive horticultural operations for example, should not be found within 5km of the hives. Should the new regulations be strictly enforced at some future date, this would prove to be a major barrier for the development of organic honey production.

3. Pesticide residue tests for honey

Producers considered testing honey for residues to be important (despite the cost involved) since it provides some evidence or credibility of their production procedures. However, sampling procedures as stated in the standards have caused some confusion, particularly for new producers seeking certification. The standards mention 'batch' sampling and also that two samples must be taken per apiary. Since this term is understood by beekeepers to mean a site where a group of hives are located there has been some uncertainty over the exact sampling procedure. In the upcoming review of the Bio-Gro standards, a better defined sampling scheme is to be developed (Interview 27).

4. Non-use of timber preservatives for hive boxes

The Bio-Gro standards permit the use of paraffin wax dipping for preserving timber. Some producers have had to go to considerable expense in replacing hive boxes with those made with more durable timber. However, producers understood this requirement and in some cases even prefer to avoid painting the insides of boxes, a practice which is permitted.

5. Prohibition of sugar feeding

The majority of both organic and conventional honey producers, packers and other industry personnel interviewed believe the prohibition of sugar feeding is unreasonable (Interviews 5, 6, 8, 9, 10, 12, 13, 14, 17, 20, 26). Many do not understand the basis of this requirement. It was suggested that there could be a greater likelihood of sucrose ending up in the honey if sugar feeding is allowed in an emergency (i.e. just prior to honey flow) than if sugar feeding was managed throughout autumn and early spring. In addition, sugar is considered by some to be a 'natural' product and so believe that there is little justification for its prohibition even on philosophical grounds. It is of interest that the majority of conventional beekeepers involved in kiwifruit pollination feed sugar during the kiwifruit flowering season as this practice increases pollen collection (Goodwin, 1997).

While feeding honey to bees during the winter period is considered by most to be more expensive, one beekeeper claimed it was easier to feed honey than sugar as he did not need the pumping and transportation equipment and could perhaps avoid making several trips to the hives over the autumn period (Interview 11). He also believes the bees are healthier when they are fed honey. How-

ever, this producer was able to produce significant quantities of multifloral honey, which serves as an ideal feed honey because of its lower market value. There could also be a disease concern with feeding honey as ideally the same honey should be fed back to the hives where it was originally produced (Interviews 9, 11). In some areas of the country it may be possible to shift hives around in the winter, making use of winter flowering plants, reducing the need to feed sugar. One beekeeper thought that producers could be encouraged to plant appropriate trees and other plants so as to develop particular winter sites for their hives (Interview 7). However, gaining permission from landowners could be difficult, and many beekeepers would be reluctant to engage in such negotiations.

Although not explicit in the standards, Bio-Gro NZ's policy is two-fold: 1) sugar feeding can be carried out in an emergency and beekeepers are now required to apply in writing for approval, if possible, prior to the start of the emergency sugar feeding, and 2) sugar feeding in general is considered to be a restricted practice. It is seen as an unnatural external intervention that should be minimized. However, currently beekeepers can include sugar feeding in a management plan approved prior to certification being obtained, provided that there is a clear strategy in place to reduce this practice over time. This potential use of sugar under the Bio-Gro standards, is not widely known by beekeepers. Bio-Gro NZ's requirement of notifying the certification agency prior to emergency feeding is entirely impractical as emergency situations often demand instant action and occur at a great distance from any means of writing a letter (or sending a fax).

The IFOAM Basic Standards state: 'By 2001 the percentage of wild products/certified organic ingredients used for feeding shall be at least 90%'. Organic sugar is available in NZ and some beekeepers have chosen to use it. BioGro NZ will be phasing in this requirement for organic beekeepers (Interview 27).

6. Heat treatment of honey

This requirement has stimulated much discussion within the industry. People frequently comment that if there is to be a restriction on the heat applied to honey, then it should be a time/temp restriction, not just temperature alone, since the time of heating could be significant. Often it is claimed that the temperature of the hives can go above 38°C and therefore believe 38°C is not logical. In addition, people ask 'What happens to honey above 38°C? How is it being affected?'

Since honey granulates naturally, restricting heat prevents organic producers from marketing liquid honey products, although one organic producer has gained permission to heat above 38°C providing this is stated on the product label as an interim measure until the issue is resolved. Most producers agree that with most types of honey, extracting at 38°C is not a problem (Interviews 8, 11, 13, 14). For smaller producers, extracting, filtering and directly packing can be possible under 38°C, however once packers are dealing with 44 gallon drums, a higher temperature is required (Interviews 8, 13, 26). Some consider that honey needs to be heated to approximately 60°C in order to melt it properly and to ensure granulation is reduced. Some research, however, has suggested that 40°C is sufficient to melt honey out of a drum (Townsend and Adie, 1953). A flash heat treatment followed by rapid cooling (a practice not permitted by Bio-Gro NZ) may in fact cause less change to the honey than a lower temperature sustained over a longer period of time (Interview 17). Several producers suspect that overseas buyers heat over 38°C in order to pack the organic honey, though in these situations a local organic label would be used, not Bio-Gro. Beekeepers also believe that other organic certification agencies around the world allow heating above 38°C and that Bio-Gro NZ should match these standards so there is a level playing field (see section 3.5). Bio-Gro NZ's view is that since most hives do not go above 38°C, this temperature should not be exceeded during processing in order to preserve the natural qualities of the honey. There is also the idea supported by some in the organic food industry that organic food should where possible be only minimally processed, although this issue is strongly contested (Clancy and Kirschenmann, 1999).

There can also be problems with filtering some types of honey under 38°C.

7. Honey must not exceed the HMF level of 8mg/kg and the 'apparent reducing sugar' content and the 'apparent sucrose content' must be 'satisfactory'

Some people suggest that tests for enzymes in honey as an indicator of heat treatment could be investigated e.g. diastase, glucose oxidase, invertase (Interviews 7, 26). However, others suggest that diastase in particular is not an appropriate quality indicator as some types of honey are naturally low in this enzyme (Interview 16). HMF levels, used as an indicator of heat treatment, can also be misleading as some honeys have been found to be naturally high in HMF (Interview 16). The revised draft Codex Alimentarius standard for conventional honey for HMF includes three proposals:

> '…not > 80mg/kg; not > 60mg/kg;
> not > 40mg/kg – however, in the case of honey of declared origin from countries or regions with high mean ambient temperatures, and

blends of these honeys, the HMF content shall not be more than 80 mg/kg.'
(Codex Alimentarius, October 1999).

In contrast to these proposals, the Bio-Gro standard is not > 8mg/kg. There is no Codex standard for organic honey as yet. Concern about the reduction in the anti-bacterial properties of honey from high heat treatments could be one reason for attempting to restrict heat treatments. However, it could be more meaningful to require a direct test for anti-bacterial activity than to arbitrarily restrict heat treatment since honeys vary considerably in anti-bacterial activity. For example, one type of honey that has high anti-bacterial activity and has been heated to say 60°C, may still have a higher anti-bacterial activity than another honey which has only been heated to 38°C but naturally has low activity (Interview 16).

The requirement for a sucrose test, introduced in 1998, is supported by most organic beekeepers. The aim of this test is to detect the practice of sugar feeding close to honey flow. The reducing sugar content of honey refers to the glucose and fructose content, the two main sugars present in all honeys. It is not clear from the standards what 'satisfactory' levels are. However, the draft Codex Alimentarius standard for conventional honey states that most honeys should contain not less than 60% reducing sugar and not more than 5% sucrose. Honeydew is a notable exception to these requirements where it should not contain less than 45% reducing sugars and not more than 5% sucrose (Codex Alimentarius, October 1999). To date Bio-Gro NZ has not put much emphasis on these test results, despite the requirements being included in the standards.

Comments from organic beekeepers about the Bio-Gro certification process are variable. While those in the North Island appear to be relatively satisfied with the procedures and the service, those in the South Island have found inconsistencies amongst inspectors. In particular, one inspector appeared to not have been trained in auditing beekeeping operations and did not ask pertinent questions. In addition, beekeepers have been amazed at the inefficiency of an inspector visiting one beekeeper one week (some distance from the inspector's home) and then returning to a neighbouring area some weeks later to visit another beekeeper. Beekeepers seem prepared to pay a user-pays based cost for inspection providing the inspector is properly trained and certification documents are completed in a timely manner by Bio-Gro NZ.

3.4 The Organic Standards Developed for the NBA

In the early 1990s, at the request of the NBA, MAF Quality Management was contracted to develop a standard for organic honey production. In 1991 the NBA received a proposed organic standard with various issues highlighted which required further discussion within the industry. Since MAF had been involved in the development of the Bio-Gro honey standards, the proposed standard for the NBA was similar in many respects (see later discussion for differences). Apparently, at this time Bio-Gro NZ accused MAF of copying their standard, although MAF felt that this was not the case as they had made a significant contribution to the Bio-Gro standard. Although MAF was keen to pursue standards for organic food production at this time, because of the controversy surrounding the development of the NBA standard and changes in MAF personnel, MAF decided to not pursue the organic honey standard. Many members of the NBA were not supportive of developing standards of any type and decided that since the Bio-Gro standard was in place, that any interested producers could adopt that standard. Hence the proposed NBA standard was not developed further. A Bio-Gro certified beekeeper in fact proposed at an NBA conference that the Bio-Gro standards be adopted as the NBA standard but this was not agreed to.

The key differences between the proposed NBA organic standard and the current Bio-Gro standards are outlined in the following sections.

1. Supplemental Feeding

The proposed NBA standard discouraged sugar feeding, however, this was one of the issues which was not resolved. The importance of documenting feeding practices was emphasized in the proposal. In contrast to this, Bio-Gro NZ clearly states that sugar feeding is prohibited unless in an emergency although, as stated earlier, Bio-Gro NZ's interpretation of this standard is slightly more flexible than indicated in the standards. Bio-Gro NZ also requires feeding practices to be documented although this was only included in the 1998 edition of the standards.

2. Production Sources

There were a number of options suggested ranging from the requirement that all pesticides used within 5km of hives must be identified and tested for in the honey, to a random sampling scheme (for pesticide residue testing) by the certifying agency. Bio-Gro NZ requires that all pesticides used within 5km of the hives be documented and that the honey is tested for these compounds.

3. Residue Levels

This was another area where several options were presented to the NBA e.g. maximum permissible level being the minimum detectable level, or residue levels being less than those permitted in the NZ Food Regulations (1984). Bio-Gro NZ states that residue levels must be less than 10% of the levels permitted in the NZ Food Regs (1984).

4. Quality Control During Processing

The proposed NBA standard stated that honey should not be stored at more than 35°C and that it should not exceed 40°C during extraction and processing. Bio-Gro NZ states that honey should not exceed 38°C during extraction, processing and storage. As discussed earlier, this issue has been a major source of contention within the industry. Maximum permitted HMF levels are 10mg/kg in the NBA standard (unless it can be shown that the natural levels of HMF exceed this) compared with 8mg/kg in the Bio-Gro standard.

5. Sampling

The NBA proposed standards emphasized the importance of traceability and so included a system whereby samples are to be taken from each extraction batch and labelled with apiary numbers. The Bio-Gro standard also requires sampling stating that two samples are required per apiary and that individual drums should be labelled according to the apiary/apiaries of production. It therefore appears that traceback is possible under the Bio-Gro standard, though it is not clear whether the system would enable an individual retail pack to be traced back to an extraction batch or not.

6. Use of Synthetic Substances

This was another issue that had not been decided upon in the proposed NBA standard. The suggested alternatives focused on prohibiting synthetic substances for wood preservation, control of pests and diseases, smoker fuel, removal of bees from honey supers and protection of stored bee combs. Bait stations for rodent control were permitted (not allowed by Bio-Gro NZ). In contrast, the Bio-Gro standard specifically states that only permitted materials can be used in the above situations, for example, paraffin wax is permitted for wood preservation.

Overall people within MAF and the honey industry in the early 1990's viewed the Bio-Gro standard as being too restrictive which they thought would limit the development of the Bio-Gro organic market and also encourage other less rigid organic trademarks to be developed. There has been a small but steady increase in Bio-Gro honey production from 1991- 1997 but in the last couple of years the number of licensees has remained fairly constant. To date there is no competing organic honey label in NZ, although at the time of writing AgriQuality NZ had offered to certify honey to the organic EU regulation. Some organic beekeepers did suggest that if there was an alternative organic certification scheme for honey that was more flexible in some areas, they may change, particularly since overseas markets did not require some elements of the current Bio-Gro standards (Interviews 11, 13). It is interesting to note that compared with the Bio-Gro standard, the proposed NBA standard was more comprehensive in setting up procedures to ensure that the organic production process could be fully verified. It is only now that Bio-Gro NZ is being forced to instigate comprehensive audit trails within its verification systems because of EU requirements (McMillan, 1999).

3.5 Comparison of Global Organic Honey Standards

Table 3 presents a comparison of the key elements of a selection of organic honey production standards which are in operation around the world. Although some preliminary comparisons can be made, it should be noted that the interpretation and implementation of the standards by the certifying agency can vary to some extent from the written standards.

It appears that all standards attempt to at least encourage beekeepers to site their hives on land not exposed to chemicals. Bioland, UK Soil Association and OCIA appear to be the toughest in this regard, requiring hives to be sited on organically managed/certified land. Although it is not always clear in the various standards, Bio-Gro NZ tends to require the most extensive residue testing programme of all the certifiers. In most of the standards reviewed, testing requirements for any certified product are not emphasized. Of all the standards reviewed here, Oregon Tilth in the USA is the most detailed, although at the time of writing they had only one operation certified (in Argentina).

There is a wide variation in the standards relating to sugar feeding, ranging from KRAV stating that sugar feeding is allowed, to the UK Soil Association stating sugar is prohibited and if fed to bees, the hives involved must be taken out of organic production for 12 months. All certifying agencies indicate that sugar should not be fed near or during honey flow. Bio-Gro NZ's standard is certainly not the toughest and it would be of interest to know the reasoning behind the UK Soil Association's stance on this issue and the responses of local beekeepers to what seems a fairly draconian measure.

Several certifying agencies do not specify permitted heat treatments of honey which indicates a large degree of flexibility. Temperatures permitted

Table 3. A comparison of selected organic honey production standards

Requirement of Standard	Bio-Gro NZ	IFOAM Basic Standard	NASAA, Australia	Soil Association, UK	KRAV, Sweden	Bioland, Germany	Oregon Tilth, USA	OCIA, USA
Location of Hives	Organic/wild areas if possible. Areas of extensive farming; at least 5km from intensive horticulture.	Organically managed fields and/or wild natural areas. Hives not placed close to areas where chemicals have been used. Exceptions can be made.	At least 5km from potential contamination. Sited in native forests or pastoral country.	Organically cultivated areas or areas of natural vegetation free of chemicals and which have been so for at least 2 yrs. Not placed within 7km of conventionally farmed land.	Hives may not be situated close to fields where chemicals are used.	Location of colonies must be limited to area under care of Bioland. Ecologically cultivated areas are to be used as nectar collecting areas whenever possible. Products labelled with "As a result of the large radius of flight of the bees it cannot be expected that in all cases they will fly over only or mainly ecologically farmed areas".	Certified organic areas/wild areas desirable, however permitted locations at discretion of certifier.	Apiaries must be on OCIA certified land. Prohibited to locate apiaries within 3km of conventional crops.
Residue Testing	If hives situated < 5km from uncertified agriculture residue testing compulsory. Satisfactory testing from hives further than 5km from uncertified agriculture may lead to reductions in frequency or range of tests.	Not specified.	Likely to be required and residues need to be < 10% MRL as stated by the Australia NZ Food Authority.	Routine testing not required. Testing only requested under special circumstances.	Routine testing not required.	No chemical therapeutic residues may be traced in the honey. Honey routinely tested for drugs but not environmental contaminants.	To verify acceptability of apiary location, testing for environmental contaminants may be required.	Type of testing (if any) required to be determined in conjunction with OCIA.
Sugar Feeding	Sugar feeding as a normal management practice not permitted. Emergency feeding permitted after prior approval obtained.	Feeding should only take place after last harvest before the season, when no foraging feed available. By 2001, percentage of wild products/certified organic ingredients used for feeding should be at least 90%.	Feeding only permitted under exceptional circumstances to overcome temporary food shortages due to climate. Feed percentage should not exceed more than 5% of diet. Sugar feeding during honey flow prohibited.	Only organically produced honey and natural pollen supplements permitted. Other feeding materials prohibited - if such materials fed, hive taken out of organic production for minimum 12 months.	Additional feeding of honey and sugar is permitted during hibernation and early spring.	Bees fed honey where possible. Sugar feeding is limited to the winter hibernation period and for creation of young colonies. Feeding should cease prior to start of nectar. Gaps in feed with nectar supply filled by Bioland honey only.	Sugar feeding prohibited 30 days preceding addition of supers to hives. If starvation imminent, organic sugar feeding is permitted although permission may be granted to temporarily use non-organic sugar.	Certified honey and bee pollen permitted. Sugar feeding permitted if starvation is imminent. Honey should be the major feed source. Sugar feeding during honey flow is prohibited.
Heat Treatment	Honey not exceed 38^{o}C. If heated > 38^{o}C, labelled as "for processing use only".	Not specified.	Ambient air temperature recommended for extraction and bottling. >40^{o}C prohibited.	Pasteurization prohibited.	Not specified in standards. According to Swedish food law, if heated must be stated on product label.	Not heated > 40^{o}C, Melitherm process permissible.	Honey not exceed 40^{o}C. Honey exposed to higher temperatures must be labelled "for processing use only". Honey may be stored for a max. of 2 years at 25.5^{o}C or less. If exposed to storage temps. over 25.5^{o}C, honey can be certified only if it is labelled "for processing use only".	Not heated > 35^{o}C and process short as possible.
Quality Tests	HMF not > 8 mg/kg. Satisfactory test results for reducing sugars and sucrose. Strainer size not < 200 microns.	Not specified.	Not specified.	Not specified.	Not specified.	18% max water (heathland 21.5%), HMF not > 10 mg/kg; Invertase min. 10 units (7 units for acacia and linden); filter not < 200 microns. If honey does not meet these standards labelled as "processing only".	HMF 40mg/kg or less.	Not specified.
Conversion Period	Brought in hives subject to 12 months conversion period.	Not specified for honey. General guidelines 12 months for animals.	Full certification normally takes 2-3 years.	Minimum 2yr conversion.	12 months.	Brought in hives subject to 12 months conversion period.	270 days.	Not specified for honey. In general standards must have been followed in full for at least 12 months before certification can be granted.
Bee Health	Follows general standards. e.g. if antibiotics used, honey not certified for double withholding period plus 12 months. Artificial insemination restricted and requires prior written approval.	Vet. medicines not allowed. Lactic, oxalic and acetic acids can be used for pest/disease control. If antibiotics used, animals withdrawn for twice withholding period. Artificial insemination prohibited.	Routine use of antibiotics prohibited. Caustic soda, lactic and acetic acids can be used for hive disinfection. Antibiotics may be used in health emergency, in which case extraction immediately following used must not be sold as organic.	Formic and lactic acids permitted. Chemical medicines permitted only when bee health is threatened. If treated, hive taken out of organic production for 12 months minimum. Artificial insemination prohibited.	Caustic soda and oxalic, lactic, formic and acetic acids permitted.	Chemo-therapeutic medication forbidden. Lactic, formic, oxalic and citric acids permitted for varroa mites. Artificial insemination may be permitted if prior approval obtained, otherwise natural reproductive processes preferred.	Routine use of oxytetracycline prohibited. If used, hive to be removed for at least 120 days. A range of practices and treatments permitted for managing AFB, EFB, chalkbrood, nosema, varroa mites, tracheal mites. Artificial insemination permitted.	Use of menthol for tracheal mite permitted. Antibiotics prohibited except when health of colony threatened. After such treatment, hive must be removed immediately and taken out of organic production. Honey extracted immediately following use of antibiotics may not be certified. Artificial insemination permitted.

by other agencies range from not greater than 35°C (OCIA) to not greater than 40°C (NASAA, Oregon Tilth). In Sweden, apparently national food law stipulates that honey should not be heated, however, any heat treatment must be indicated on product labels. It is interesting to note that Bioland permits the Melitherm process which is a high temperature short time treatment. The temperature of the heating coil is 70°C, however the honey would not reach this temperature as it is only in contact with the coil for a very short time (personal communication - Bioland Beekeeping Consultant).

Only Bio-Gro NZ, Oregon Tilth and Bioland specify any quality criteria for honey, suggesting that these types of standards are not a priority amongst certifiers. The conversion period for honey appears to be at least 12 months in most countries, although Oregon Tilth allows 270 days. Often standards are not clear about this issue. The UK Soil Association demands a 2 year conversion period to full certification. i.e. For organic certification bees must forage on organic land (conversion period two years) or areas of natural vegetation free from pesticides for at least two years.

In all standards the routine use of antibiotics is prohibited. Where the standards vary is the length of time hives/honey cannot be certified after use of veterinary treatments. For example, NASAA and OCIA state that honey extracted immediately after antibiotic use cannot be certified whereas Bio-Gro NZ and the UK Soil Association state that treated hives must be taken out of organic production for at least 12 months. Oregon Tilth states that honey from treated hives cannot be certified for at least 120 days. These differences reflect the general differences in livestock standards around the world.

Although not summarised in Table 3, the requirements for the EU regulation may become of particular interest to honey producers in NZ with the recent development of AgriQuality NZ starting to offer certification to this standard. Some of the key features of the EU regulation include the requirement of having a 3km radius around hives which provides nectar and pollen sources 'essentially from organically produced crops and/or spontaneous vegetation', the allowance of sugar feeding (including non-organic sugar) up to 15 days before honey flow, although artificial feeding in general would not be encouraged; one year conversion period; and the prohibition of the routine use of chemical medicines although if the use of such a medicine is necessary, the colonies must be isolated and subjected to a one year 'conversion period'. It will be of considerable interest to honey producers to see how AgriQuality NZ interprets the standard and implements audit procedures.

Overall the Bio-Gro NZ standard for organic honey production does not appear to be too different from other standards around the world. However, it is true that some standards do not restrict the temperature to which honey can be heated or prohibit sugar feeding. Bio-Gro NZ's requirement for extensive residue testing does appear to differ considerably from other certifying agencies. Of course, there is no requirement or necessity for Bio-Gro NZ to alter its standards to match others around the world. Bio-Gro needs to review the pertinent literature, take into account what practical and feasible management practices might be in NZ and add these elements to fundamental organic management principles and philosophies. Some argue that the requirements of the importers of NZ organic honey products should also be considered in setting standards, though one could equally argue that Bio-Gro NZ could choose to set higher standards than these requirements in an effort to be a market leader.

3.6 The Future of Organic Honey Production

Those involved in the honey industry, whether a beekeeper, packer, researcher etc, appear to have differing views on the future of the organic honey industry. Some believe that it has a good future and therefore plan to increase organic honey production. Others feel that the market for organic honey is very fragile and that a large producer coming on stream could have a major effect on premiums. Some producers are also wary of the growing levels of organic honey production in South America, particularly Argentina, and the adverse effect that this honey may have on their organic markets. Most people believe that organic honey will always be a niche market. Some organic producers consider that premiums could be improved if producers were motivated to work together instead of competing against each other. Currently, there is a significant tendency for producers to be very secretive about markets and who they are selling to. There is a strong feeling amongst industry personnel as a whole that the Bio-Gro standards could be improved so that they are more realistic and allow producers to compete more easily on the world organic honey market. Such sentiments are firmly focused on the two issues of sugar feeding and heating during honey processing.

What this does not reveal, however, is the comparative advantages New Zealand has as an organic producer of honey. All international organic standard setting agencies must deal with two key threats which are currently absent in New Zealand. These are the prevalent diseases and the effect of genetically engineered crops on production and markets since genetic engineering is not

permitted in the organic industry internationally and honey containing GM pollen cannot be certified. Currently, one of the reasons for the relatively simple 'conversion' from conventional to organic systems in New Zealand is the comparatively disease-free nature of NZ's beekeeping industry - very few drugs are used at all. Should European Foulbrood (EFB) enter NZ, it could be very difficult for organic producers to retain certification, though over time it may be possible for bees to be bred for EFB resistance. Likewise, the New Zealand industry has not yet had to develop a serious action plan for dealing with pollen contamination from genetically modified crops as these are not (yet) grown commercially in New Zealand.

Chapter 4

Development of Standards

4.1 Introduction - Standards/ Regulations affecting the Honey Industry

There is a range of legislation which affects the practices of beekeepers including the Apiaries Act 1969 (to be totally repealed in 3 years from Nov 1 1999 with the introduction of the Animal Products Act), the BioSecurity Act 1993, the Commodity Levies Act 1991, the Pesticide Regulations 1983, the Food Hygiene Regulations 1974, the Food Amendment Act 1996 (Food Safety Programmes), the Food Act 1981 and the Medicines Act 1981. The key areas covered by these Acts include:

- Registration of apiaries
- Use of drugs
- Disease notification and control
- Export certification
- Pest management strategy for AFB
- Importation of bees, bee products and equipment
- Payment of levies to the NBA
- Labelling and use of pesticides if poisonous to bees
- Hygiene practices in extraction, processing and packing of honey
- HACCP (Hazard Analysis Critical Control Points) based food safety programmes
- Minimum standards for labelling and composition of honey
- Therapeutic claims

The Animal Products Act, introduced November 1 1999 will also affect beekeepers and the industry as a whole. The two objectives of the Act are: (Insker, 1999)

1. To minimise and manage risks to human or animal health arising from the production and processing of animal material and products by instituting measures that ensure so far as is practicable that all traded animal products are fit for their intended purpose.
2. To facilitate the entry of animal products into overseas markets by providing the controls and mechanisms needed to give, and to safeguard, official assurances for entry into those markets.

It is considered that the main risks relating to honey production are chemical residues, toxins getting into honey from plants and the use of antibiotics. Ideally all producers exporting would establish a Risk Management Programme (RMP) however it is recognized that Regulated Control Schemes for particular issues may be more appropriate either on a regional or nationwide basis. For example, the monitoring of honey collected from toxic areas might best be managed via a Regulated Control Scheme than by individual beekeepers. Eventually the intention is that all industries involved with food will have to set up either a HACCP based Food Safety Programme or a HACCP based RMP under the Food Amendment Act or Animal Products Act respectively. Under the Animal Products Act beekeepers will have to have a RMP in place by Nov 1 2002. Since there are approximately 5000 beekeepers in NZ, with over 90% of these being small beekeepers, it could be appropriate for a FSP/RMP template to be developed which the majority of beekeepers could then adapt for their own particular situation. It is possible that this requirement for establishing either a FSP or a RMP will result in increased centralization of honey extraction facilities since it will be quite costly for many beekeepers to upgrade their own facilities to meet the required standards, particularly when extraction facilities are only used for a short period of time each season.

Currently there are no significant compulsory regulations/standards relating to the quality and composition of honey sold within NZ. The Australian New Zealand Food Authority (ANZFA) has proposed a new standard for 'Sugars, honey and related products' as part of the process of harmonizing the Australian and NZ Food laws. In this proposal honey is defined as:

> 'the natural sweet substance produced by honey bees from the nectar of blossoms or from secretions of living plants or excretions of plant sucking insects on the living parts of plants, which honey bees collect, transfer and combine with specific substances of their own, and which is deposited and stored in the honey comb to ripen and mature'
> (ANZFA Proposal P181,1998).

Hence the prescriptive definition of honey that is currently in the NZ Food Regs (1984) and the Australian Food Code (1998) whereby the basic composition of honey is defined (water, reducing sugars, sucrose, ash) is to be removed. There are no other regulations specifically relating to honey in the NZ Food Regulations or the Australian Food Code. It could be argued that because honey is resistant to microbial growth and in general is not a high risk food in terms of food safety, detailed standards governing the quality of the product are not required. However it is also recognized that all food should be produced according to the principles of good manufacturing practice.

The labelling of pollen, royal jelly and propolis products is still to be resolved. In November 1997, the NZ Ministry of Health released a discussion document in which it was proposed that pollen, royal jelly, and propolis products would have to carry labels stating that these products may cause 'severe allergic reactions'. Despite some members of the industry requesting that this not go ahead, these labelling requirements were infact introduced in April 1999. Since then the Regulations Review Committee has recommended to Parliament that the mandatory health warnings be revoked as the committee believed that the Minister of Health did not have sufficient evidence to justify the warnings. Currently a review committee (the composition of which has been controversial) is preparing a further recommendation on what the labelling requirements should be.

Honey is traded within NZ largely on the basis of colour, taste and general appearance and sometimes reputation of the supplier. Conductivity, moisture and pH tests may also be used to characterize honey. On occasion producers and/or buyers may have samples evaluated on the basis of pollen content however only one NZ packer routinely performs this analysis.

The Commerce Commission, under the Fair Trading Act, has published guidelines for food labelling, promotion and marketing. These guidelines are principally concerned with not misleading consumers. In theory if a honey product was inaccurately labelled as manuka for example, the Commerce Commission could be asked to investigate the case. However, when evaluating such a case, the Commerce Commission often use 'what the general consumer would understand about the product from the label' as a guide to their evaluation. If a product appeared and tasted like manuka but the pollen analysis indicated otherwise, it is unlikely that the Commerce Commission would be interested in pursuing the case.

The Codex Alimentarius standard for honey is currently being revised and a draft standard is at step 6 of the 8 step review process. The codex standard includes reference to moisture content, contaminants, hygiene, labelling and methods of analysis. In addition, the annex to the standard includes guidelines for the composition of honey (reducing sugar, sucrose, solids, minerals, acidity, diastase activity, HMF) for commercial as opposed to governmental use.

Export markets do not generally require a specific set of specifications for honey. The EU is probably the most stringent market, although their requirements can vary - sometimes the Codex Alimentarius standard can be used, however importers can also invoke other criteria. In 1998 the EU Monitoring Programme was introduced whereby all countries exporting product to the EU are required to carry out a residue testing programme. In this programme, one honey sample is collected per 300 tonnes of annual production i.e. 30 samples are randomly collected nationally (*NZ Beekeeper,* March 1998). The samples are analysed for antibiotics, carbamates, pyrethroids, organochlorines, organophosphates, lead, zinc and arsenic. In 1998, only one sample was found to contain organophosphorous compounds (below the NZ tolerance level), 8 samples were found to contain lead (all below the maximum permitted level of 2ppm) and all 30 samples contained zinc at a range of 0.42 - 10.9 ppm (maximum permitted level is 40ppm) (*NZ Beekeeper,* June 1998). In the 1999 analyses, 14 samples were tested for oxytetracycline and sulphonamides and 11 samples for carbamates, pyrethroids and organophosphorous compounds. None of these residues were detected. Only one of the 11 samples was found to contain arsenic (0.02 ppm), no samples contained lead while all of the samples contained zinc (range 0.34 - 2.15 ppm). No other routine residue testing programme for honey is carried out in NZ.

In view of the limited regulations/standards controlling the quality of honey, some members of the industry believe that standards relating to composition and overall quality could be beneficial for the industry. Since NZ only produces a very small amount of honey on the world market it is considered that NZ has to aim for the top end of the market in order to sell successfully. High standards could therefore help secure markets for NZ products. On the other hand, others in the industry have been attracted to beekeeping because of the low level of regulations and so strongly resist suggestions that industry standards should be introduced. The following sections therefore further elaborate the range of views expressed on different types of standards.

4.1.1 NBA Marketing Committee Approach to Standards

A Strategic Plan developed by the marketing consultant as part of his annual report in 1997, identified a number of marketing initiatives for the forthcoming years. These strategies including creating a sound scientific knowledge base for the differentiation of honey varieties, like wine vintages, and putting in place identification and certification systems for the development of honey standards. It is recognised by the consultant that there is a problem in beekeeping with meeting product specifications. This is because honey crops produced by beekeepers are variable according to weather conditions and flowering flora in their particular areas. Thus, the consultant identifies three 'quality areas' in terms of standards: varietal integrity; consumer safety, and antibacterial functionality (New Zealand Honey Industry

Marketing Plan, 1998:4). Varietal integrity is left to brands and packers to work out through market competition; consumer safety is relevant to organic production because it addresses issues, such as honeys gathered from transgenic crops and chemical residues in honey along with botulism spores in honey and honey collected from tutu; and antibacterial functionality relates to the qualities of active-manuka honey and perhaps other honey types (New Zealand Honey Industry Marketing Plan, 1998:5).

The marketing plan states that the NZ Honey Food and Ingredient Advisory Service (NZHFIAS) 'will publicly support those brands that put production and identification programmes in place for their own products, when approached for comment by any media or group in the marketplace'. Since it is also stated that the NBA will not be responsible for developing or policing any standards the possibility arises that the NZHFIAS could end up supporting a brand that perhaps claims to have various standards in place but is not necessarily 'true to label'. The importance of third-party verification systems for honey cannot be overlooked particularly since the food industry as a whole is rapidly moving in this direction both for quality management systems and product standards.

At the 1999 World Honey Congress held in Canada, the marketing consultant established the World Honey Institute which at this stage involves the USA and UK honey industries. One of the key purposes of setting up this world body is to develop honey standards and market values (*NZ Beekeeper,* November 1999). Initially the group will address the issue of economic adulteration, although this is generally not considered to be a major problem in NZ.

The NBA Marketing Committee is currently working with HortResearch and other researchers to firstly establish why standards are needed and what types of standards might be beneficial in the marketplace. Once this is agreed, it is hoped that a number of tests may be developed which together might form a standard for a particular purpose and honey type. The marketing consultant suggests that a 'Honey Standards Monitoring Group' could check companies' stated claims for their products thereby allowing producers to set their own standards and quality management procedures. However, in order for such a system to gain credibility within the broader food industry it may be necessary to have a more formal approach whereby a certified auditor carries out the verification of honey products. One of the difficulties for the industry is being able to afford such a third party verification system, and so perhaps the establishment of an industry monitoring group is a practical approach as a first step.

Nonetheless it would probably be of benefit in the long term if an industry monitoring group could incorporate accepted verification/auditing procedures from the beginning. In many respects such a development would be similar to that of Bio-Gro NZ. One other difficulty in allowing companies to essentially set their own standards, for example, for geographical identity/image, is that the consumer may become confused with a large range of 'standards' operating within the marketplace. A code of practice outlining some general guidelines on these issues could certainly reduce some of this potential confusion (see section 4.1.3).

4.1.2 Industry Perspectives

Internationally, pollen analysis has been adopted as the principle test to be used for establishing the main varietal source of a honey. In situations where pollen analysis is disputed, flavour is often the deciding factor. Many people involved in the NZ honey industry have serious doubts about the usefulness of pollen analysis (Interviews 6, 8, 9, 11, 16, 18) although some believe it can be useful particularly in combination with other tests (Interviews 1, 26). Molan (1998) has outlined a number of problems with using pollen analysis including the over- and under-representation of some nectar sources by their pollen in the honey, the possible contamination of honey samples with pollen during extraction and the possible transfer of pollen from a bee which had previously visited a flower that was not currently being harvested for the nectar.

Since the discovery that some types of manuka honey contain special antibacterial properties, now known as the Unique Manuka Factor (UMF), there has been much discussion about the development of varietal standards. As discussed earlier, such standards could be developed for a variety of reasons:

1. To protect the industry and the consumer against fraudulent producers who label honey for example, as 'manuka' in order to gain the higher price.
2. To protect the industry and the consumer against inaccurate labelling particularly with respect to medicinal properties.
3. To encourage or require producers to market more consistent products in terms of varietal source, flavour and medicinal properties, to ensure that products are safe and to document production procedures and product characteristics.

These three key reasons for developing standards (defining varietal sources (and/or geographical regions), defining medicinal properties and demonstrating product conformity and safety) are quite distinct and would require different types of

standards to be developed. Several people in the industry have commented that the first most necessary step for the industry is to decide why it might want to develop a standard.

Some of the views on standards expressed by those interviewed are summarized in Table 4. While some believe that standards will be required by markets eventually and so the industry should start to move down this path, others wish to continue with current practices, a perspective that is embodied in the individualistic nature of the whole beekeeping industry. The difficulty in educating consumers both in NZ and overseas about any honey standards will be an on-going issue for the industry. Because of the divergent nature of views within the industry, it appears that any agreed industry policy would be unlikely in the immediate future. However, it is possible that as more individuals adopt standards of various types, the industry as a whole may be pulled in that direction in order to secure markets.

There are approximately 12 different varieties of honey that are regularly produced in NZ - clover, tawari, manuka, rewa rewa, kamahi, blue borage, nodding thistle, honey dew, rata, thyme, ling heather and pohutakawa. Since manuka has gained a premium in NZ because of the reported anti-bacterial properties, considerably more honey has apparently been labelled as manuka than what is thought to be produced. Because of this there is considerable support within the industry to develop a standard that would prevent producers from fraudulently benefiting from the increased premium. In 1997, the marketing committee of the NBA suggested in a draft standard that honey labelled as 'manuka' must contain at least 70% manuka honey as determined by pollen analysis in conjunction with sensory testing (NBA, 1998). Although the NBA Executive claimed to support standards in principle, they requested that more work be done to investigate appropriate tests for defining manuka honey since pollen analysis was not enthusiastically supported. Also the Executive suggested at their July 1998 meeting that the Honey Exporters' Joint Action Group should report on their work on manuka standards before any decisions are made. However, the Joint Action Group has made little progress in this area, although a report summarizing available data on honey types and standards has been produced (NZ Honey Exporters JAG, 1998). The question remains as to who would administer/operate such a standard (although in the draft standard it was suggested that the NZHFIAS could operate it) or whether such a standard would be included in an agreed industry code of practice. As mentioned earlier, third party verification of such a standard

Table 4. Views of Industry Stakeholders on Standards

In Support of Standards	Against or Questioning Standards
need for product differentiation, evidence required	will I be able to sell my product?
NZ needs to offer something different - small producer	don't tell me how to run my business
guarantee to consumer, need to back up with data	my experience tells me what my honey is and I want to call it what I like
external offshore forces making industry head down this path	not needed in the marketplace - NZ and Export
NZ could lead the world in standards	no marketing advantage for most types of honey
some customers starting to look for varieties and consistency in colour, flavour etc	markets not asking for varietal honeys backed up by standards
market demanding traceback systems	rarely sell overseas by floral source
protect industry from rogues who label incorrectly, need integrity and credibility	what happens to the honey that doesn't meet the standard?
if customer given a choice, will choose product with some verification providing no great price differential	varietal standards great in perfect world but people buy honey because like the taste, does the Japanese housewife care? would need an accurate way for defining a standard that was water-tight
want to be able to market a consistent product, backed up with data	pollen analysis would not stand up to legal scrutiny
standards could be useful, but not pollen analysis	why worry about classifying a product when customer judges product primarily on flavour?
provision of consistent quality to customers more important that purity	could never say what a standard was going to be in any one year - regional, seasonal variation
quality mark would be good to have	manuka price will stay high without standards

for manuka is really required in order to gain credibility in the market place.

Although only a small amount of the honey labelled as manuka is also labelled with a UMF rating, the increased price for manuka has occurred because of anti-bacterial properties. Some argue that the most important standard for manuka is that relating to anti-bacterial activity since some manuka honeys with high pollen counts (ie relatively pure) may be less active than others with lower pollen counts (Interview 16). A group of manuka honey producers have developed a standard. However, because this exercise has not been taken to completion (with the standard being formally registered with a trademark and a proper audit system established) the UMF labelled honey currently on the market cannot really be guaranteed to be true to label. Also in most cases a certified laboratory is not carrying out the analysis of the honey samples supplied by the beekeepers (Interviews 16,17). Therefore at present theoretically a company could get away with not doing any testing at all and simply pay the active manuka honey group to use the trademark on their products. Apparently, one of the difficulties is that not enough of the UMF rated product is being sold in order to generate the funds required to manage the standard and also to carry out further research to investigate and document the benefits of the UMF rated honey (Interview 23).

4.1.3 Code of Practice

With the general move of the Australia NZ Food Authority's towards removing prescriptive food regulations from the Food Code, industries are being encouraged to develop their own code of practice. A code of practice is an industry-agreed guideline which can aim to control key steps in the production of a foodstuff. Industries may choose to develop codes of practice for a variety of reasons. For example, possible functions that a code of practice may provide include:

1. The provision of a checklist to help members of the industry to identify significant points of a food production process and thus ensure that appropriate procedures, practices and controls are used.
2. The opportunity to make public the acceptable and agreed industry practices of a food manufacturer, thus demonstrating the nature and quality of the production system.
3. An assurance of continued production of a safe, wholesome, high quality food product.

Hence with respect to the beekeeping industry, guidelines for such areas as bee feeding practices, disease control and monitoring, honey processing procedures, hive management and transportation, honey storage, environmental conditions etc could be included. The process itself of establishing a code of practice can be a very positive development for an industry as it encourages open debate about practices. For example, at the 1999 NBA AGM there was a reluctance from some members to discuss the issue of drug use for maintaining bee health because of a perceived fear of possible negative publicity about the use of drugs in the beekeeping industry particularly when the industry enjoys an environmentally friendly image. If such issues were dealt with in a positive manner it would likely benefit the industry in the long term.

At the 1998 AGM of the NBA, the Southland Branch put forward a remit (which was passed) to develop a code of practice for the industry (*NZ Beekeeper,* 1998). This process has begun, although as reported at the 1999 NBA conference, it is still in its initial stages of development. The Southland group circulated some initial ideas for comment at the conference. Such a code of practice would apply to all people working with hives and/or hive products and would serve to document acceptable beekeeping practices. A code of practice could include guidelines for quality and varietal standards, however in the developing document circulated such material has not as yet been suggested. Rather, it is more likely that the code of practice would include statements on general hive management and honey processing practices which would be particularly useful for newcomers to the industry. The development of the code of practice at this time could present an opportunity and a forum for industry participants to discuss the possible inclusion of *guidelines* relating to varietal, medicinal and product conformity standards. Since a code of practice is essentially not a legally binding document, this might be more acceptable than other forms of 'standards' to some members of the industry, although the necessity or otherwise of enforcing/policing standards would still remain an issue.

4.1.4 Quality Management Systems

Various types of quality management systems have been adopted by food industries for some time, however it is only in the last few years that these have gained a higher profile particularly with the advent of ISO quality systems internationally. The framework of the ISO 9001 series has helped industries revise their existing systems and perhaps more methodically implement and document new systems. In NZ, the adoption of the Food Safety Programme legislation has also lead to an increased awareness of audit programmes in the food industry.

In the report 'Strategy for Growth in the Domestic Honey Market' (Chai Fang et al., 1993), one of the long term strategies recommended was the development of international quality standards.

Although the industry has not yet experienced trade and retail barriers from not having quality certification as was predicted in 1993, it is highly likely that this will still happen in the future. There are certainly examples of other horticultural sectors (Campbell et al, 1997) experiencing trade and retail pressures to adopt quality systems. It is also of interest that Chai Fang et al. (1993) suggested that a honey industry quality seal may also be of benefit to the industry, a concept that is still being discussed (*NZ Beekeeper,* November 1999).

Currently there appears to be an increasing range of quality management systems available to the food industry. Safe Quality Food (SQF) 2000, designed for primary producers in the food industry, has been developed in Australia and some industries are now expressing interest in this in NZ. AgriQuality NZ is in the process of launching its own quality system - AgriQuality Assured. This system combines the usual components of a quality management system with requirements to assure food safety (HACCP based approach) as well as consistency in quality. One company within the honey industry is soon to be accredited with this assurance mark, the first honey company in NZ to have the most comprehensive quality system audited by a third party -in this case AgriQuality. Under this system a comprehensive traceback system has to be in place i.e. from hive to retail pack of honey. Consumers will be able to use the internet to find out about the product (which has a unique identification code) and how it was produced.

To date, only one other company involved with honey has been audited for a quality management system, in this case ISO 9002 for honey extraction and the packing of honey and beeswax (not beehive management). The producer obtained a business development grant to assist in the establishment of the required procedures and documentation. Although the producer does not claim that buyers are looking specifically for this type of accreditation, he believes that he may have more easily secured sales because of the accreditation since people do understand what ISO 9002 involves. Having obtained ISO accreditation it will now be easier for this producer to include a food safety programme within his system which is an advantage. One of the challenges in the successful development of a quality management system is convincing all staff of the importance and merits of such a system and this is no different within the honey industry. Unless all staff are committed to the system then implementation and on-going documentation will be difficult.

The adoption of quality management systems by the beekeeping industry is clearly in its infancy. However, it is likely that gradually more and more members of the industry will adopt such systems as they become more widespread in the international food industry and perhaps as competitors adopt quality systems. For many beekeepers, honey packers and processors, the adoption of a food safety programme or a risk management programme may well be the first step that is taken in the development of quality management systems.

4.2 The National Pest Management Strategy (PMS)

The National Pest Management Strategy for American Foulbrood (AFB) is the first Pest Management Strategy to be put into effect by a primary industry in New Zealand. It was empowered under the BioSecurity (National American Foulbrood Pest Management Strategy) Order 1998, pursuant to the BioSecurity Act 1993, and came into force on 1 October 1998. The BioSecurity Act 1993 provides for the exclusion, eradication and effective management of pests and unwanted organisms, and is the legal means by which the industry could develop and fund its pest management strategy.

The PMS embodies a concerted attempt on the part of the honey industry to replace the previous regulations in the Apiaries Act for AFB control in NZ honey bees. The Strategy's goal is to eliminate the incidence of American Foulbrood in managed beehives within a period of ten years, although this does not mean the total elimination of the causative organism (Bacillus larvae) from the New Zealand environment (per Strategy, p5). This is considered a realistic goal by most industry participants. The degree to which the Strategy reworks existing disease control practices, and how it might be reinterpreted, circumvented and frustrated by beekeepers, in practice, though, is important. This is because the Strategy sits uncomfortably with the individualistic nature of some industry participants since some believe it is an attempt to control their activities rather than control the disease (Newton, 1999).

While the Strategy reproduces portions of the Apiaries Act 1969 which previously governed disease control in beekeeping, there is some antagonism towards it on the part of *commercial* beekeepers adjusting to the 'user pays' environment. These beekeepers see the PMS as questioning and superseding what they already know and practice, and at the same time obliging them to pay for this 'knowledge'. This is because the Strategy requires beekeepers to document in writing their existing disease control practices, and to pass a test in order to demonstrate their proficiency in performing those practices. Under the Apiaries Act 1969, all persons keeping bees in New Zealand were required to register their apiary sites, to have a code number for identification, and to fill out annual disease declarations.

Some industry participants regard the PMS as a money-making device and an instance of beekeeping becoming 'bureaucratised'. For many, the strength of beekeeping is the 'freedom' it affords, and the need for individual management is seen to differentiate beekeeping from other primary activities (Newton 1999:52). The fact that the NBA, as Management Agency for the PMS, has currently contracted the services of AgriQuality New Zealand, formerly MAF Quality Management, to carry out the Strategy, adds to this perception. For marketers, however, the Strategy is regarded as a market growth strategy, going some way towards providing evidence of quality systems to meet international quality standards, particularly for live bee exports.

Under the Pest Management Strategy, any person who keeps bees in New Zealand must have their hives checked for AFB by an 'Approved' person. Beekeepers are given the opportunity to become 'Approved' beekeepers by passing a competency test for American Foulbrood, organised through regional Branches of the NBA, and by entering into a Disease Elimination Conformity Agreement (DECA) with the Management Agency (the NBA). Having an approved status allows beekeepers to check their own hives for disease as they have always done in the past. Beekeepers who do not pass or wish to sit the test, however, are required to furnish to the Management Agency each year a Certificate of Inspection signed by an Approved beekeeper who has checked their hives. A Disease Recognition and Destruction course is available for participants who want to refresh or further their skills in disease detection and destruction before sitting the examination and/or if they happen to fail it.

All beekeepers are required to have a DECA which is a disease control plan outlining a beekeeper's obligations and responsibilities in order to reduce clinical cases of AFB in his or her hives to 0.1% within a period of time (per Strategy, p6). Existing requirements under the Apiaries Act 1969, like having to provide annual disease declarations recording the number of hives found with AFB during the previous year, the dates on which they were found to be inflicted, and the dates when they were destroyed, are in addition to other requirements prescribed by the Strategy. Beekeepers still have to notify of the incidence of AFB in their hives within seven days, and to destroy by burning any hives found to be inflicted with AFB within the same period. In many ways, the Strategy lays out and makes clearer performance criteria to be practised by beekeepers and the penalties associated with non-compliance.

As a national strategy, however, the PMS imposes generic disease control practices across the country, and in this respect may undermine *local* knowledge (Newton 1999:52-53). Beekeepers arguably develop effective disease control measures in negotiation with the specific demands and peculiarities of the local environments in which they keep bees. For example, conditions in certain areas may render it more or less feasible to burn diseased hives when found, or to move those hives to safer places in order to burn them. This means that DECA's must be sufficiently flexible and tailored to beekeepers' particular operations and the contexts in which they operate. Although there is apparently some provision for such flexibility within the PMS, this needs to be kept in mind particularly in the early stages of the implementation process.

A recent request to the MAF Regulatory Authority on the part of the Australian Quarantine Inspection Service (AQIS) for permission to export honey to New Zealand was interpreted by advocates of the PMS as posing a serious threat to the implementation of the Strategy. Honey from Western Australia has not previously been permitted into New Zealand because of the risk of transmitting *Melissococcus pluton*, the cause of European Foulbrood (EFB). The introduction of EFB would mean that New Zealand beekeepers would most likely have to feed antibiotic drugs to their bees. These drugs are not a cure for EFB and apparently mask the presence of American Foulbrood. The proposal was thrashed out by subscribers on the beekeeping electronic-mail distribution lists where it was considered the role of the Apicultural Research Advisory Committee to provide scientific material evaluating the 'minimum risk' posed by the proposed imports. It was also noted that the strains of AFB in Australia may be different strains to those found in New Zealand. Recent research suggests that strains of AFB which have been reported to be resistant to antibiotics may infact be naturally resistant strains (Interview 2).

Chapter 5
Conclusions

5.1 Introduction

This chapter addresses three issues concerning the 'greening' of the honey industry. These are:

- Why has the honey industry reached the current state of 'greening', as outlined in the previous chapters?
- What may occur in the next few years that will influence the industry?
- What does this research group recommend to further enable the 'greening' of the industry?

5.2 The Current State of the Industry

It is clear that the honey industry has significant advantages over other sectors within New Zealand horticulture in developing a 'green' strategy for the industry. Honey is already seen as a natural product, and the relatively disease-free state of the New Zealand industry means that conventional beekeeping practice is already well advanced towards a 'food safety', 'environmentally enhanced' or 'organic' profile in production.

However, given these natural advantages, the New Zealand honey industry has been a significant underachiever compared with other sectors like kiwifruit, wine and pipfruit where concerted industry wide strategies are in place to facilitate the establishment and auditing of 'greener' product profiles. There are probably a number of reasons why this is the case:

- Handbrake or headstart? The intrinsic qualities of honey production may be acting as a handbrake on further development rather than being seen as giving honey a 'headstart' compared with other industries. There is a widespread perception that honey is already a green product, and that consumers already buy honey for its healthy or environmentally enhanced properties. Consequently, there is no need to engage in any further 'greening' of the industry which may cost producers money.
- No integrity problems. Unlike other industries, honey has not had an 'integrity crisis' for its product. Kiwifruit suffered a crisis in the Italian market in 1992 when kiwifruit were found to exceed Maximum Residue Levels for certain agrichemicals (Campbell et al., 1997). The wine industry suffered embarrassment both through problems with verifying the varietal ingredients on wine labels, and even the integrity of entire labels in relation to specific vintages (Fairweather et al., 1999). The pipfruit industry likewise perceived dangers in the global market as food safety criteria were increasingly stringently being applied to apples by British supermarkets (McKenna and Campbell, 1999). These crises led to significant action plans by each of these industries to secure their product against any further integrity claims. Honey has yet to suffer such a public embarrassment about the integrity of its labelling (although there have been cases where producers have accused each other of inaccurate labelling), or the food safety qualities of conventionally produced honey.
- Market orientation. Honey is primarily sold in the domestic market compared with these other sectors where the majority of the product is exported. Consequently, honey is not scrutinised in two important ways. Firstly, New Zealand consumers have not traditionally demanded that food safety be strongly audited and labelled. Secondly, a major arena of food safety policing occurs on entry to export markets, at either the national level, or in the food safety requirements of large distribution chains like supermarkets. Because honey is not exported in significant quantities, these potential barriers do not affect the majority of New Zealand honey producers.
- Reaching critical mass. In other small food production sectors like organic food exporting, the small scale of the industry acts as a deterrent to developing new schemes and systems as the financial burden of developing such schemes costs a relatively larger amount of money per producer than is the case in a larger industry. Consequently, there are industries which have yet to reach 'critical mass' where there is enough product and value in the industry to support co-ordinated infrastructural activities (without government assistance).
- Low state subsidisation. The previous point leads to an obvious comparison to beekeepers in other countries. Many of these infrastructural issues are resolved in other countries through government subsidies. In the case of New Zealand, Section 2.5.1 outlined the characteristically low level of government support of the infrastructure of the industry.
- The sociology and politics of beekeeping. There are other aspects to the social and economic configuration of the honey industry which have acted as impediments to the development of greening strategies. First, the honey industry is comprised of highly individualistic producers working in small businesses. There is an ideological predisposition among these beekeepers away from any kind of centralised planning or initiative over their activities. This was reinforced by the unsatisfactory perceptions many

beekeepers hold about the now defunct IMD and HMA. This leads to a second difficulty. Namely, the inability of the NBA to receive the co-operation of the entire industry and the deliberate attempts by some participants in the industry to manipulate national activities favourably in terms of their individual product and/or economic interests, or to stymie initiatives that might be seen as generically beneficial to their competitors. The increasing significance of regional activities as opposed to national strategies adds to the complexity of successfully managing a national organization. Overall, there is a very low sense of urgency about 'greening' honey, in relation to the grower perceptions evident in the kiwifruit, pipfruit or wine industries.

5.3 Possible New Issues Affecting Industry Greening

There is no doubt that in most of the other sectors studied in this programme there was a very low historical level of concern among most producers about greening issues (with the exception of long term organic producers). However, in each of these industries events *ex machina* intervened to prompt a change in industry strategies. The previous section outlined a similar pattern of grower conservatism in the honey industry, and the absence to date of a significant crisis prompting a change in industry strategy or more widespread producer support for current initiatives.

This section details the possible *ex machina* scenarios that might have an influence on the honey industry:

- Changing organic industry standards. It is possible that pressure from organic producers might induce Bio-Gro NZ to revise its standards and relax some criteria - particularly around sugar feeding and temperature during processing and indeed an organic honey producer group has recently made a submission proposing changes in these areas. Also, pressures from IFOAM may induce Bio-Gro NZ to increase their sanctions on agrichemical use in surrounding farmlands. Were this to occur, it is likely that other world organic standards would be applied for by organic beekeepers and Bio-Gro NZ would lose its current monopoly over organic certification in New Zealand. AgriQuality NZ's recent interest in certifying honey to the EU regulation may indicate the beginnings of alternative certification options. Were the distance between conventional and organic beekeeping to decrease, the industry might experience a significant shift of conventional producers into organic certification.
- Export Increase. Experience from other industries suggests that contact with the export market inevitably increases greening pressures. There are various ways in which exports of honey might increase. First, restrictions on importing cheap honey might be lifted by the NZ Government, leading some local honey producers to take their higher quality product offshore. Second, overseas demand for natural products might increase and lure more honey producers into the overseas market in search of better returns.
- Changing carrying capacity of bees. There is clearly a set carrying capacity for apiaries around New Zealand beyond which the industry cannot expand. However, the extent of the capacity could change. This would most likely be in response to changing farming practices. Were horticultural industries to continue to expand relative to pastoral production the amount of floral sources for bees may increase. Similarly, if greening tendencies in other sectors continues to lead to a decline in herbicide use, floral sources from weeds would increase. Our prediction is, given greening trajectories in other sectors, that there will be a small increase in floral sources, and resultant room for slight expansion in the amount of honey produced.
- Consumer Demand. One of the given assumptions of New Zealand consumer behaviour is that in the past they have generally trusted the 'clean green' nature of New Zealand food and displayed a comparatively low level of interest in assurances of food safety. Under such a situation, the honey industry is unlikely to experience any undue 'pull' factors to 'green' honey for the domestic market. This scenario, however, is no longer so certain. Recent events surrounding food safety and the labelling of GM foods have triggered unprecedented levels of concern by New Zealand consumers in the safety of food products. Concern over GM has, in the latter part of 1999, led to further debate about antibiotic use in livestock production, and food safety issues have had an unusually high profile in the 1999 election campaign. Therefore, we can no longer assume that New Zealand consumers are unconcerned about food safety, and eventually such concern may result in some retail chains attempting to obtain a market premium by emulating UK and European retail chains which have instituted sophisticated environmental and food safety auditing systems. Under such a scenario, new pressures would be place on the honey industry to audit its environmental qualities. The AgriQuality Assured programme recently adopted by one honey packing and marketing company indicates a step in this direction.

- Auditing. As the general trend in the global food economy is towards auditing systems for food products, there is a possibility that the policy process in New Zealand will become more pro-active towards developing such systems. It has already been proposed by both major parties that a new food ministry, or restructured MAF section would be created to devise better food quality assurance. In such a policy setting, the honey industry will be highly likely to require more comprehensive auditing systems.
- Crisis. At the heart of current consumer food safety concerns in Europe are a series of 'food scares' like BSE that emerged unexpectedly during the 1990s. There are many possible food scares that could occur in New Zealand, and a range of possible crises that can emerge for local food producers. Were New Zealand to experience such a crisis in the next ten years, both consumers and policymakers would become considerably more committed to environmental and food safety auditing.
- Pull factors from overseas markets. Even with all the above factors being taken into account, industries like kiwifruit recruited the majority of their organic growers due to the premiums being achieved by organic fruit in the export market. This is a potent factor, and if organic or other audited and standards-based honey products achieve high levels of success in the export market, other local producers may choose to follow suit. However, in entering the export market, the requirements for standards, auditing and environmental qualities become more demanding.
- GM Foods. Should the Environmental Risk Management Authority (ERMA) decide to approve the commercial production of GM crops, there is a high probability that export honey, and even honey for the domestic market, will have to develop auditing systems for establishing the likelihood of GM pollen contamination.

5.4 Recommendations

While the authors of this report do not wish to usurp the expertise of actual participants in the industry, the view from outside the industry coupled with a broad understanding of wider trends in environmental food standards and exports, does provide some insights that are worth noting. Consequently, we would like to offer the following recommendations to the industry.

In general, the trend towards 'greening' of food exports is already pronounced in other horticultural sectors, and the pressures behind such moves are tangible and real. While there are specific issues which mean that the honey industry will experience these pressures later than other sectors, and to a lesser extent, due to the 'naturalness' of honey as a product, we nevertheless suggest that it would be prudent for the honey industry to respond to greening pressures in the following ways.

1. *Petition Bio-Gro NZ for a revision of the honey standards for organic production.* The perceived distance between conventional and organic honey production is very small (smaller than any other food production sector in New Zealand). This presents an opportunity for the honey industry to shift more producers into the production of higher-value organic honey. This small distance has also placed pressure on Bio-Gro NZ to situate the organic standards for honey more stringently than might be applied to other food production sectors, in order to retain the distinctiveness of organic versus conventional production. This distinction may not hold in the medium term. Given the current trajectory of the NZ organics industry towards harmonising organic standards internationally, it is our opinion that this will inevitably present honey producers with the option of adopting less stringent organic standards for honey. This will occur either through Bio-Gro revising its standards towards more lenient international alternatives, or through the availability of other standards audited by a different agency to Bio-Gro NZ. In the current situation, the honey industry may find it propitious to negotiate such a transition for organic honey in the near future, consequently building on the existing goodwill and experience of inspectors currently auditing the honey industry. To assist in the revision of the Bio-Gro standards a collective submission from a group of organic honey producers has been formulated.
2. *Educate Growers on Organic Production.* Given the opportunity presented by organic production, the researchers noted that many conventional producers misconstrued the technical requirements of the organic standards. Bio-Gro NZ should undertake an education programme for conventional producers, and the NBA may well support such activities were it convinced that honey should go down the industry 'greening' path.
3. *Auditing existing features of honey.* Honey is unique among the products studied by this research programme, in that it already has very significant environmentally-enhanced, nutraceutical, and food safety qualities. We would suggest a more pro-active stance by the industry towards trying to quantify and audit these qualities for marketing purposes. Such auditing overlaps with issues of varietal standards due to the specific qualities of, for example, manuka

honey. The general trend within First World markets, and a nascent trend among New Zealand retailers, is towards greater auditing of food quality management systems. Given that such systems may be demanded of all food products in the future, honey should take the initiative and create auditing systems that not only satisfy quality management system criteria, but could also be used to market honey's unique properties. At the present point in time, there seems to be an unwillingness for the industry to discuss potentially negative issues like antibiotic use in case this should alarm consumers, when these issues need to be publicly discussed in order to construct quality management systems to ensure food safety.

4. *Honey Imports.* The general experience of many exporters in New Zealand is that First World markets are increasingly becoming protected by 'green protectionist' mechanisms which use the food safety or environmental qualities of food production as means of resisting imports. This tactic has become widespread, and only suffers from political illegitimacy in a small minority of countries, like New Zealand, who unreservedly promote free trade. The situation of the honey industry compellingly illustrates the legitimate use of environmental protection given the unique absence of most pests and diseases from New Zealand honey production. New Zealand should strongly resist sacrificing the environmental integrity of the honey industry in the cause of further promoting free trade to the detriment of all other economic and environmental concerns. Hence, any moves to allow imports of foreign honey should be treated with extreme prejudice by the honey industry.

5. *Industry Structure.* Currently there is a significant divergence of opinion amongst members of the National Beekeeping Association with regard to the management and organization of this key industry group. In order to facilitate many of the above recommendations and indeed the general development of the industry, a cohesive and comprehensively-based group would be a major asset. The wide range of responsibilities and activities now integral to the beekeeping industry as a whole needs to be acknowledged and understood by all participants so that possible new industry structures can be usefully discussed. The extensive experience of many members along with the abundant enthusiasm should serve the industry well as it re-establishes an agreed management and operating structure.

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Appendix

Those involved in the honey industry who agreed to be interviewed for this study are described according to their primary occupation, or their position most relevant to the interview material.

1 Honey Packer/Marketer
2 Beekeeper
3 Organic Beekeeper
4 Honey Packer/Marketer
5 Ex NBA President
6 Beekeeper, NBA Executive Member
7 Organic Beekeeper
8 Organic Beekeeper
9 Apiculture Scientist
10 Apiculture Advisory Officer
11 Organic Beekeeper
12 Apiculture Advisory Officer
13 Beekeeper, Packer, Exporter
14 Organic Beekeeper
15 Marketing Consultant
16 Biochemist
17 Apiculture Services Manager
18 Beekeeper, NBA Executive Member
19 Beekeeper, NBA Executive Member
20 Honey Packer/Marketer
21 Beekeeper
22 Beekeeper, Retailer
23 Beekeeper, NBA Executive Member
24 Retired Beekeeper
25 Beekeeper
26 Beekeeper/Packer
27 Bio-Gro NZ Technical Manager