Ministry for Primary Industries
Manatū Ahu Matua

Apiculture

MINISTRY FOR PRIMARY INDUSTRIES
2018 APICULTURE MONITORING PROGRAMME

New Zealand Government

KEY POINTS

- The 2017/18 season produced an estimated honey crop of 20,000 tonnes, an increase of around 5,000 tonnes (35 percent) on last year, driven by an increase in hive numbers and in the national average yield per hive.
- The national average hive yield in 2017/18 of 22.7 kilograms was up 21 percent on the prior year, but was still significantly less than the rolling 10-year average of 29.6 kilograms. Hive yields in the North Island were impacted by unpredictable and poor weather conditions resulting in 20.1 kilograms per hive average yield. Hive stocking rates may also be a contributing factor. Despite challenging climatic conditions which included drought and ex-cyclones, average to good honey yields (31.2 kilograms per hive) were achieved in the South Island.
- The total number of registered hives reached 881,185 in June 2018, an increase of 85,607 hives (11 percent) on the prior year. Corporate and iwi-based investment was the most significant contributor to this growth driven by strong overseas market demand for mānuka honey and other high value bee products such as propolis.
- The number of registered beekeeping enterprises increased by 9 percent to 8,552. This increase mostly occurred in the hobbyist and semi-commercial categories. There were 49 "mega commercial" beekeeping enterprises (more than 3,000 hives) in New Zealand as at June 2018 compared with 43 at June 2017.
- Average honey prices paid to New Zealand beekeepers in 2017/18 (often referred to as bulk honey prices) were lower than in 2016/17 for most honey types apart from monofloral mānuka honey. Honey packers lowered their buying price for multifloral mānuka honey following the release of the Ministry for Primary Industries' (MPI) mānuka honey definition. The fall in bulk buying price for multifloral mānuka honey had a knock-on effect on most other honeys, especially the buying price of dark honeys such as honeydew honey.
- There was a significant drop in the average price for clover honey in 2017/18 compared with 2016/17. This price drop may be the beginning of a correction of the unexplained high prices paid for clover honeys in recent years, and is more in line with trends in global honey prices.
- The honey prices reported in this report cover the period from July 2017 to June 2018. There are industry reports of further softening in prices on offer to beekeepers since mid-2018 for multifloral mānuka honey and non-mānuka honeys.
- The value of New Zealand's pure honey exports increased by 6 percent in 2017/18 to $348 million, driven equally by increased export volumes and prices. Export volumes to the United States of America rose sharply eclipsing China as the largest market and accounting for 21 percent of total honey exports by volume in the year to 30 June 2018.

TABLE 1: KEY PARAMETERS OF THE NEW ZEALAND APICULTURE INDUSTRY, 2013 TO 2018

YEAR ENDED 30 JUNE		2013	2014	2015	2016	2017	2018
Beekeeper and hive numbers							
Number of registered beekeeping enterprises[1]		4,279	4,814	5,551	6,735	7,814	8,552
Number of registered bee hives[1]		452,018	507,247	575,872	684,046	795,578	881,185
Honey production							
New Zealand annual honey production	Tonnes	17,825	17,610	19,710	19,885	14,855	20,000
Honey yield per hive	kg/hive	39.4	34.7	34.2	29.1	18.7	22.7
Honey prices[2]							
Bulk honey price range for light clover honey	NZ$/kg	5.00-7.30	5.50-8.30	7.00-10.75	9.50-13.00	10.00-14.00	8.50-12.00
Bulk honey price range for mānuka honey[3]	NZ$/kg	10.45-60.00	8.00-85.00	9.50-116.50	12.00-148.00	10.80-127.00	12.00-135.00
Honey exports (pure honey)[4]							
Honey export volume	Tonnes	8,054	8,702	9,046	8,831	8,450	8,692
Honey export value (at fob[5])	Million NZ$	145	187	233	315	329	348
Honey export price (at fob[5])	NZ$/kg	17.99	21.45	25.77	35.62	38.92	40.04

Notes

n/a Not applicable

1 Registered beekeeping enterprises and hives under the National American Foulbrood Pest Management Plan.

2 Prices paid to beekeepers for bulk honey. The beekeepers supply the packaging (drums or intermediate bulk containers) and cover freight costs to the buyers premise. The honey prices reported in this report for 2017/18 cover the period from July 2017 to June 2018.

3 Mānuka honey as identified by the beekeeper/supplier. The range in price is influenced by the rating on industry grading systems such as UMF®, MGO™ or equivalent. The Ministry for Primary Industries' (MPI) mānuka honey definition was finalised in December 2017, therefore, the price range for 2017/18 may reflect this.

4 New Zealand honey is mainly exported as pure honey in retail packs and in bulk. The data shown is for pure honey exports only.

5 fob = free on board

Source: AsureQuality Limited and Statistics New Zealand.

PRODUCTION AND FINANCIAL PERFORMANCE OF APICULTURE IN 2017/18

The profitability of many beekeeping enterprises in 2017/18 did not improve on the prior year due to a drop in honey prices for honey types other than monofloral mānuka honey, and low honey production in some areas. Rising fuel prices during the season also impacted profitability.

HONEY PRODUCTION

Increased honey crop in 2017/18

The 2017/18 season produced an estimated honey crop of 20,000 tonnes, a significant increase on last season (2016/17) driven by both a higher average yield per hive and an increase in total hive numbers (Tables 1 and 2). The average hive yield was 22.7 kilograms per hive, up 21 percent from the prior year. However, due to seasonal factors and the ongoing change in focus of many commercial beekeepers away from maximising yield to maximising financial return, hive yield was well below the rolling 10-year average of 29.6 kilograms per hive.

North Island beekeepers generally reported a better season than 2016/17, with an estimated honey crop of 13,500 tonnes for the North Island (up 46 percent). However, many beekeepers considered the 2017/18 season to be below average, especially in the north, central, and western areas. This is borne out by an average hive yield of 20.1 kilograms per hive for 2017/18, only 70 percent of the rolling 10-year average for the North Island (Table 2). More than three quarters of registered hives are in the North Island. Therefore the overall performance of the North Island beekeeping season has a significant impact on New Zealand's annual honey production.

Some hive yields in Northland and Taranaki dipped below 10 kilograms per hive. The poor mānuka honey crop in the Coromandel was mainly attributed to cool and wet weather over spring. Beekeepers in this region also mentioned overcrowding of hives and disease pressure as contributing factors. Most beekeepers in Gisborne, Hawke's Bay and the Wairarapa had an average season.

Several beekeepers in the North Island reported a short flowering season for mānuka where nectar flows built up and ended quickly. This resulted in a mānuka flowering period of only four weeks in many areas compared to the usual 10 to 12 weeks. Experienced beekeepers commented that a short flowering season for mānuka has occurred in the past, raising questions whether this phenomenon is a characteristic of mānuka flowering or whether it can be explained by the weather patterns in a given season.

Rewarewa and tawari crops did reasonably well, with beekeepers who harvest these crops commenting that it was an exception to an otherwise disappointing season. These tree crops are mainly located in the Coromandel, Bay of Plenty and Waikato.

Average honey yields were produced from pasture crops in the Waikato and other North Island regions, helping to lift the overall honey crop for the North Island above last season.

In contrast to the North Island, South Island beekeepers had average to good hive productivity in 2017/18 at 31.2 kilograms per hive (Table 2). Canterbury beekeepers had an average to good season, reporting good honey yields from pasture. Beekeepers on the West Coast capitalised on good flowering

TABLE 2: NEW ZEALAND HONEY CROP ESTIMATES, 2009 TO 2018

YEAR ENDED 30 JUNE	2009 (tonnes)	2010 (tonnes)	2011 (tonnes)	2012 (tonnes)	2013 (tonnes)	2014 (tonnes)	2015 (tonnes)	2016 (tonnes)	2017 (tonnes)	2018 (tonnes)	10-year average (tonnes)
North Island total	7,952	7,563	6,790	5,595	11,770	13,210	14,730	14,365	9,245	13,500	10,472
North Island yield/hive (kg)	35.0	31.3	26.4	19.5	37.7	36.4	35.0	27.7	15.2	20.1	28.4
South Island total	4,613	4,990	2,660	4,790	6,055	4,400	4,980	5,520	5,610	6,500	5,012
South Island yield/hive (kg)	34.2	36.9	20.0	35.2	43.3	30.5	32.1	33.3	30.1	31.2	32.7
New Zealand total	12,565	12,553	9,450	10,385	17,825	17,610	19,710	19,885	14,855	20,000	15,484
New Zealand yield/hive (kg)	34.7	33.3	24.2	24.6	39.4	34.7	34.2	29.1	18.7	22.7	29.6

Note
With the increasing trend of beekeepers moving hives long distances to harvest mānuka, in particular in the North Island, it is no longer feasible to provide a regional breakdown of estimates of honey production. Therefore, honey crop estimates are reported for the North Island and South Island only.
See Information about the Report for details on how the annual honey crop is estimated.
Source: AsureQuality Limited.

and nectar flow for kamihi, mānuka and southern rata. Drought conditions in Southland and Otago led to variable honey crops of thyme and clover. Bees in these areas spent time gathering water to cool the hives down and hence spent less time gathering nectar.

Hive numbers increased but at a slower rate

Wintering hive numbers at the end of June 2017 were recorded at 795,578 hives. Many larger commercial beekeeping enterprises remain in an expansion phase and undertook substantial hive splitting programmes through the spring of 2017. This, coupled with large numbers of nucleus colonies prepared for sale, both to established beekeepers and industry newcomers, saw an addition of 85,607 registered colonies to give a wintering total of 881,185 hives at 30 June 2018 (Figure 1). This increase (11 percent) was smaller in magnitude to that seen last season (when wintering hives increased by 16 percent), with the drivers, such as the value of mānuka honey, remaining largely the same.

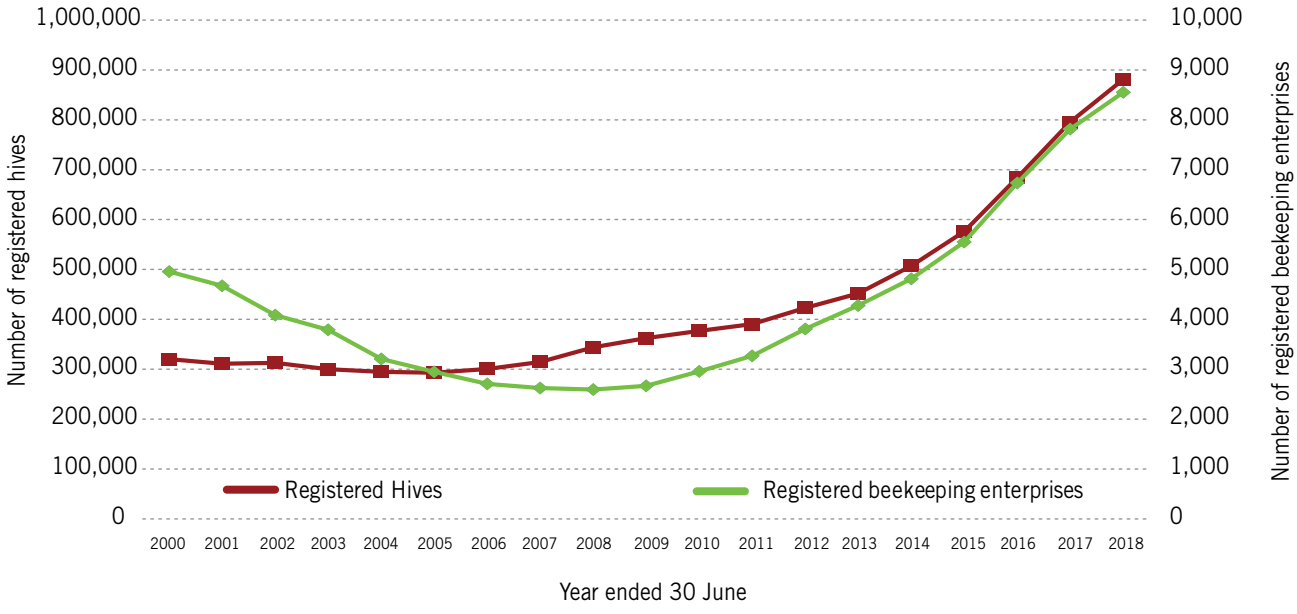
Beekeeper numbers have continued to grow, although more slowly than last year, with a further 738 new registrations (9.4 percent increase) over the course of the season (Tables 3 and 4). The ratio of beekeeping enterprises between islands continues to move in favour of the North Island (Table 3) which accounted for 80 percent of the new registrations (589 additional enterprises) in the last year.

There are 49 "mega commercial" [1] beekeeping enterprises in New Zealand as at June 2018 compared with 43 in the previous year (Table 4). Corporate and iwi investment in beekeeping enterprises has slowed over the last year. Internal growth in the "mega commercial" category continues to drive a significant portion of the increase in hive numbers. These beekeeping enterprises, as well as some of the larger family businesses, continue to invest in research such as trials of hive health products. A few businesses have bought farm land to secure their supply of mānuka honey. This land will typically have mānuka already growing in some areas generating honey production and cash flow, whilst further areas will be turned into mānuka plantations using mānuka cultivars that produce lots of flowers, have high nectar dihydroxyacetone (DHA) and provide a longer flowering period.

Around 5,700 new apiaries were registered over the 2017/18 season to accommodate the additional hives. Most of these new apiaries are in the North Island due to the greater distribution of mānuka forage.

1 A "mega commercial" beekeeping business was defined by the National Beekeepers Association in 2015 as one with more than 3,000 hives.

FIGURE 1: REGISTERED BEEKEEPING ENTERPRISES AND HIVE NUMBERS IN NEW ZEALAND[1], AS AT 30 JUNE, 2000 TO 2018



Notes
1 Registered beekeeping enterprises and hives under the National American Foulbrood Pest Management Plan. Data from 2013 to 2018 is at 30 June. Data for prior years is at early May to mid-June. Only minor differences in hive numbers are expected over the months of May and June.
Varroa was discovered in hives in New Zealand in 2000.
Source: AsureQuality Limited.

HONEY PRICES

Average honey prices paid to New Zealand beekeepers in 2017/18 (often referred to as bulk honey prices) were lower than last year for most honey types (Table 5). The honey prices reported in this report cover the period from July 2017 to June 2018. Changes or fluctuations in honey prices after June 2018 are not included.

Mānuka honey definition

In December 2017, the Ministry for Primary Industries (MPI) finalised a definition that can be used to authenticate whether or not a particular honey is New Zealand mānuka honey. The definition is made up of a combination of five attributes - four chemicals from mānuka nectar and one DNA marker from mānuka pollen. Numerical thresholds for these five attributes categorise mānuka honey as either multifloral or monofloral mānuka honey. **https://www.mpi.govt.nz/growing-and-harvesting/honey-and-bees/manuka-honey/** The definition is being implemented through a General Requirements for Export (GREX) for bee products, which came into effect on 5 February 2018. This means that all honey labelled as mānuka honey will have to be tested by an MPI-recognised laboratory, and must meet the science-based definition before it can be exported from New Zealand.

Monofloral mānuka honey prices held firm whilst prices for mulifloral mānuka honey decreased

Prices for mānuka honey that met the definition for monofloral mānuka honey, and with a high rating according to industry grading systems such as UMF®, MGO™ or equivalent, held up during 2017/18.

After the mānuka honey definition was finalised, honey packers lowered their buying price for multifloral mānuka honey, and in particular if it also had low ratings on industry grading systems such as UMF®, MGO™ or equivalent. This was likely due to honey packers deeming that such honey could not readily be mixed with other honeys and still meet the multifloral mānuka definition. Anecdotal feedback from industry reported that customer and retail demand for multifloral mānuka honey also declined resulting in further price disparity between monofloral and multifloral mānuka honeys by mid-2018.

TABLE 3: NEW ZEALAND BEEKEEPING ENTERPRISE, APIARY AND HIVE STATISTICS[1], AS AT 30 JUNE 2018

REGION	Beekeeping enterprises	Apiaries[2]	Hives[2]
Northland/Auckland/Hauraki Plains	2,336	10,771	158,867
Waikato/King Country/Taupo	807	6,036	116,128
Coromandel/Bay of Plenty/Rotorua/Poverty Bay	1,022	7,689	143,604
Hawke's Bay/Wairarapa/Manawatu/Taranaki/Wellington	1,933	15,385	253,946
North Island	**6,098**	**39,881**	**672,545**
Marlborough/Nelson/West Coast	659	4,874	63,127
Canterbury/Kaikoura	1,093	6,600	90,617
Otago/Southland	702	4,172	54,896
South Island	**2,454**	**15,646**	**208,640**
New Zealand	**8,552**	**55,527**	**881,185**

Notes
1 Registered beekeeping enterprises, apiaries and hives under the National American Foulbrood Pest Management Plan.
2 Regional location of apiaries is at their wintering sites. The regional location of hives is based on the location of the apiaries.
Source: AsureQuality Limited.

TABLE 4: SUMMARY OF BEEKEEPING ENTERPRISES[1] BY HIVE NUMBER

AS AT 30 JUNE	2010	2011	2012	2013	2014	2015	2016	2017	2018
5 hives or less	1,745	2,044	2,463	2,828	3,162	3,639	4,330	4,873	5,262
6 to 50[2] hives	695	678	774	843	964	1,109	1,446	1,781	2,017
51 to 500[3] hives	319	336	351	379	443	530	662	833	911
501 to 1,000 hives	99	109	115	122	124	129	135	155	179
1001 to 3,000 hives	81	84	87	90	92	111	126	129	134
>3,000[4] hives	18	16	16	17	29	33	36	43	49
Total	**2,957**	**3,267**	**3,806**	**4,279**	**4,814**	**5,551**	**6,735**	**7,814**	**8,552**

Notes
1 Registered beekeeping enterprises and hives under the National American Foulbrood Pest Management Plan.
2 Beekeepers with 1-50 hives are considered hobby beekeepers.
3 Beekeepers with greater than 350 hives are considered commercial beekeepers.
4 Data for >3000 hives category between 2010 and 2013 is as at 31 March as data at 30 June is not available. Data for 2014 to 2018 is at 30 June.
Source: AsureQuality Limited.

Drop in prices for non-mānuka honeys

The fall in bulk buying price for multifloral mānuka honey (described above) had a knock-on effect on most other honeys, especially the buying price of dark honeys such as honeydew honey (Table 5). Packers who used to blend mānuka honey with other honeys to meet industry grading systems or specific batch orders, could no longer do so to the same extent, because the blended honeys would likely only meet the multifloral mānuka honey definition, for which there was lower demand.

There was a significant drop in the average price for clover honey in 2017/18 compared with last year (Table 5), with industry reports that prices have weakened further since mid-2018. This price drop may be the beginning of a correction of the unexplained high prices paid for clover honeys in recent years (2015/16 and 2016/17), and seems to be in line with trends in global honey prices.

A recovery in honey production in the 2017/18 season, coupled with generally stable export and domestic market consumption (retail and manufacturing), has seen honey stocks recover from last year's low. Several of the larger honey companies are vertically integrated and therefore have a reduced need to buy honey stocks from independent beekeepers.

Anecdotal reports suggest that many beekeepers have higher than usual stocks on hand of multifloral mānuka honey and non-mānuka honey such as clover honey. They have not been willing to sell at the lower prices on offer, which may be below the cost of production in some instances. These beekeepers will be keeping a close eye on the performance of the 2018/19 season conscious that most of the large honey companies went into the season with good honey inventories.

TABLE 5: RETURNS FOR APICULTURE PRODUCTS, 2013 TO 2018

YEAR ENDED 30 JUNE	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Bulk honey[1] ($ per kg)						
Light (clover type)	5.00-7.30	5.50-8.30	7.00-10.75	9.50-13.00	10.00-14.00	8.50-12.00
Light amber	5.50-8.50	4.50-8.00	7.00-9.00	9.00-11.50	6.50-13.00	7.50-10.00
Dark, including honeydew	4.50-8.50	5.50-10.00	7.00-12.50	8.00-14.50	8.00-16.00	5.00-8.50
Mānuka[2]	10.45-60.00	8.00-85.00	9.50-116.50	12.00-148.00	10.80-127.00	12.00-135.00
Beeswax[3] ($ per kg)						
Light	7.50-8.50	8.00-10.50	9.00-12.50	11.00-15.00	12.00-17.00	16.00-17.00
Dark	6.50-7.80	6.50-7.80	8.00-10.00	9.00-10.00	12.00-17.00	15.00-16.00
Pollen[3] ($ per kg)						
Not dried or cleaned	16.00-30.50	16.00-30.50	16.00-27.00	16.00-25.00	16.00-25.00	16.00-25.00
Cleaned and dried	40-00-45.00	40.00-45.00	40.00-46.00	...	...	...
Pollination[4] ($ per hive)						
Pipfruit, stonefruit and berryfruit	60-120	60-120	60-140	60-150	70-180	80-200
Kiwifruit						
– Hawke's Bay	120-180	120-185	120-180	165-300	200-300	190-300
– Auckland	120-150	120-150	120-150	150-400	150-400	180-400
– Bay of Plenty	120-195	140-210	142-195	145-400	150-400	175-400
– Nelson	120-150	120-150	115-195	178-190	130-190	150-200
Canola and small seeds (carrots)	150-195	150-195	150-195	130-200	200-250	200-250
Live Bees[3]						
Bulk bees for export ($ per 1kg package)	27-29	27-32	28-32	31-35	31-35	31-35
Queen bees (per queen) local sales ($)	33-37	33-37	30-37	35-60	14-80[5]	20-80[5]

Notes

... Data not available.

All prices are exclusive of GST.

1 Prices paid to beekeepers for bulk honey. The beekeepers supply the packaging (drums or intermediate bulk containers) and cover freight costs to the buyers premise.

2 Mānuka honey as identified by the beekeeper/supplier. The range in price is influenced by the rating on industry grading systems such as UMF®, MGO™ or equivalent. The Ministry for Primary Industries' (MPI) mānuka honey definition was finalised in December 2017, therefore, the price range for 2017/18 may reflect this.

3 Prices paid to beekeepers. The beekeepers cover the freight costs to the buyers premise.

4 Prices paid to beekeepers. Prices at the lower end of the range are for hives delivered to depot sites. Upper end prices include delivery into the orchard and sugar for 3 to 4 one-two litre feeds to stimulate the bees to collect pollen. Higher prices were also demanded for hives placed in orchards (in particular kiwifruit orchards) under netting.

5 Queen bee prices includes the price of virgin queens in the price range. The production and sale of virgin queens is an emerging trend.

Source: AsureQuality Limited.

Shift in market destinations for New Zealand honey exports

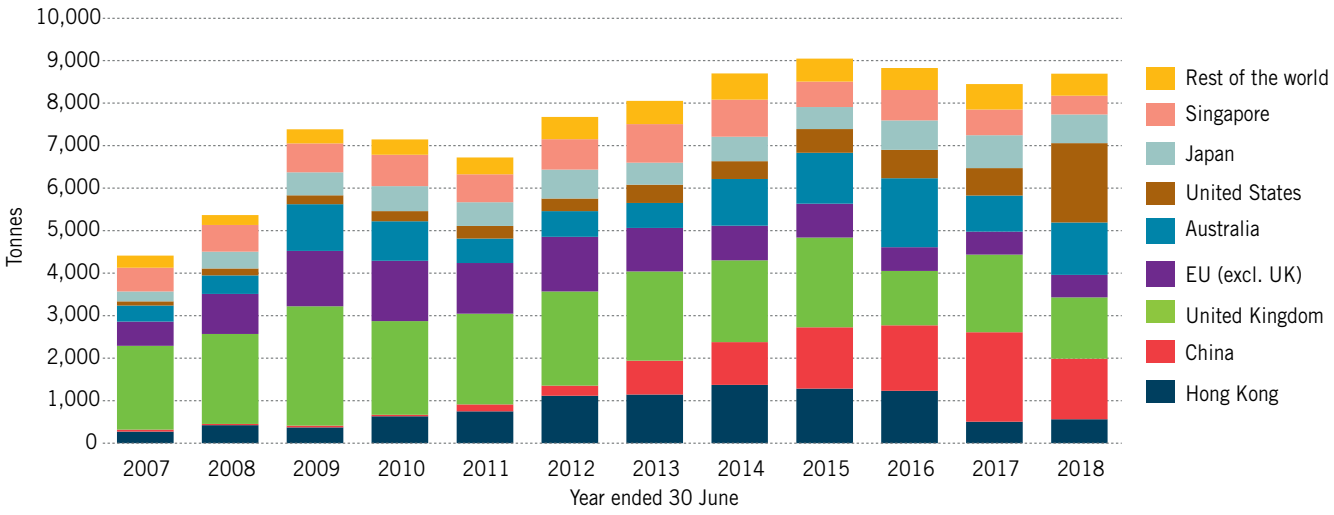
New Zealand exports of pure honey[2] in the year to 30 June 2018 totalled 8,692 tonnes, which was up slightly from last season but still in the 8,000-9,000 tonnes range where volumes have remained for the past six years. Revenue was up 6 percent on the previous year, to $348 million, driven equally by increased export volumes and prices (Table 1).

Significant increases in export volumes to the United States of America (US) and Australia were partially balanced out by falls in export volumes to China and the United Kingdom (Figure 2). Honey export volumes to the US stood out this year with an almost threefold increase from the prior year. This increase in exports to the US is likely due to initiatives by industry to establish strategic relationships with new retail partners.

While retail honey export volumes regained some of the ground lost in the 2016/17 season, bulk honey exports (honey in drums) remained relatively stable (Figure 3). The main destinations for New Zealand bulk honey exports in 2017/18 were the United Kingdom (43 percent), Belgium (24 percent) and Japan (15 percent). Exporting honey in bulk gives increased packaging flexibility. Bulk honey is also often used as an ingredient in pharmaceutical products such as wound dressings.

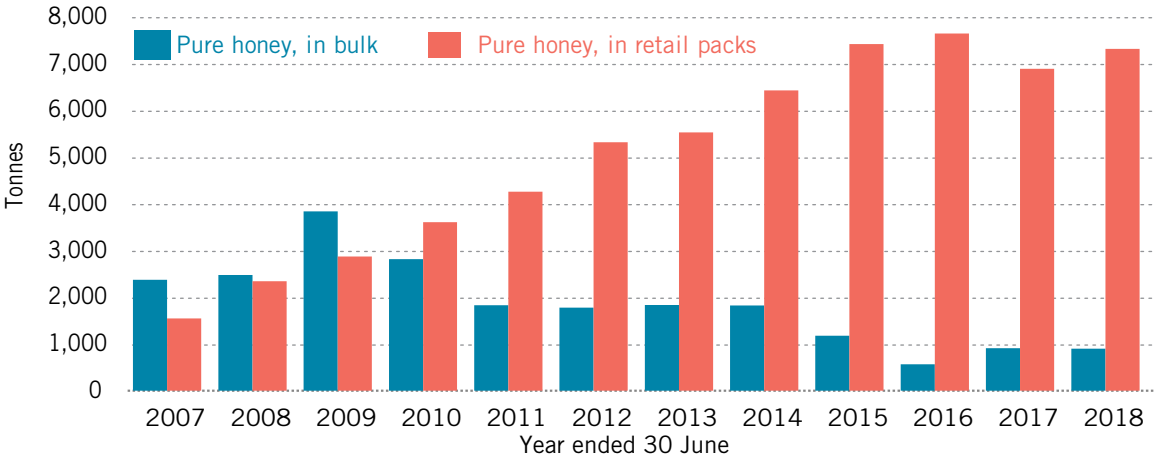
2 Pure honey exports includes honey sold in bulk and retail packs, and as comb honey and honeydew only. New Zealand honey is also exported as an ingredient in other food and non-food products such as bakery products, cosmetics, health supplements and medical products.

FIGURE 2: NEW ZEALAND PURE HONEY[1] EXPORTS BY DESTINATION, 2007 TO 2018



Note
1 New Zealand honey is mainly exported as pure honey in retail packs and in bulk. The data shown is for pure honey exports only.
Source: Statistics New Zealand.

FIGURE 3: NEW ZEALAND PURE HONEY[1] EXPORTS BY PRODUCT TYPE (EXTRACTED HONEY), 2007 TO 2018



Note
1 New Zealand honey is mainly exported as pure honey in retail packs and in bulk. The data shown is for pure honey exports only.
Source: Statistics New Zealand.

OTHER REVENUE SOURCES

Pollination

Demand for pollination services continues to increase with ongoing expansion in several horticulture sectors including kiwifruit, apples, avocados, stonefruit and blueberries. Prices per hive increased for some crops and regions compared with the prior year.

Many beekeepers in recent years have been reluctant to supply hives for pollination due to the lucrative honey market and the increase in corporate beekeepers who do not see pollination services as part of their core business. The industry, however, has seen a significant softening of prices being paid to beekeepers for non-mānuka honey in 2017/18. This may cause some beekeepers to reassess their involvement in providing pollination services, with a view to re-entering in the 2018/19 pollination season.

Live bee exports

Live bee exports from New Zealand rebounded to 19,007 one-kilogram packages in 2017/18, up 26 percent on last year (Figure 4). While this was a gain, the volumes are still very low compared to the average across the last decade. As has been the case in recent years, all exports were to Canada and with the low world honey price, demand for bees has remained depressed.

Bumblebee shipments to the Maldives increased to 11,800 individual bees in the year to 30 June 2018, up from 9,600 last year. These bees are mainly used to pollinate crops grown in greenhouses.

Propolis and beeswax

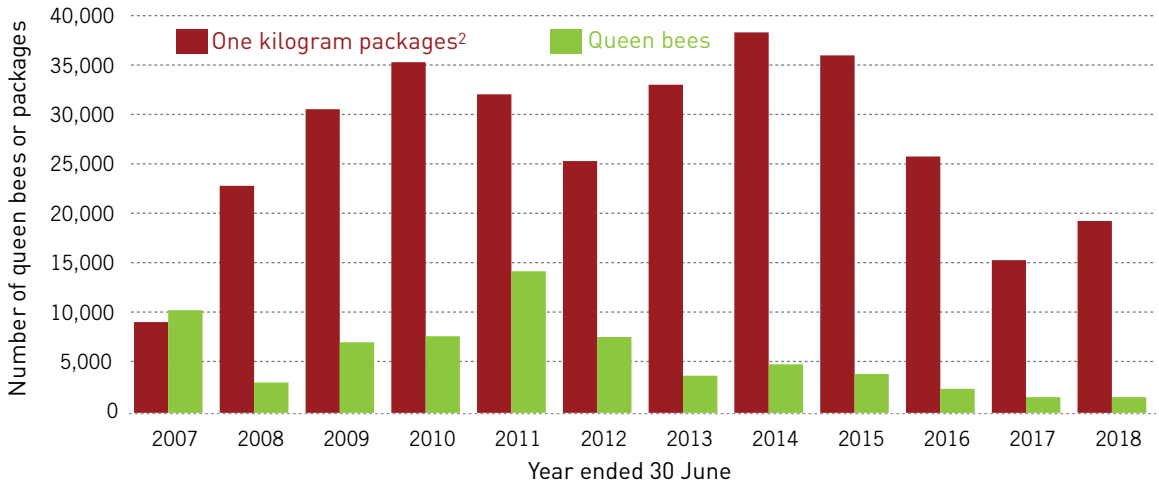
Propolis is a resin collected by bees from some tree species and marketed as a dietary supplement. Interest in dietary supplements continues and as such market demand for propolis remains strong, particularly from Asia.

Beekeepers gather propolis off special mats placed in hives or by scraping boxes and frames. Propolis in this form is regarded as raw propolis as it contains some beeswax (the proportion varies throughout the season) as well as other contaminants such as parts of bees. Pure propolis is the processed product that has been separated from beeswax and other contaminants.

The recovery rate of pure propolis from raw propolis is approximately 37 to 47 percent early in the season. This decreases to 15 to 25 percent recovery when the nectar flow is on as bees add more wax to the propolis when honey is being produced. Beekeepers reported receiving similar prices in 2017/18 to last season at $54 to $197 per kilogram for the raw unprocessed product (depending upon likely recovery rate), with quotes of $360 to $400 for the pure product.

The continued growth of the New Zealand beekeeping industry has further increased domestic demand for foundation wax or wax for coating plastic frames. As has

FIGURE 4: NEW ZEALAND EXPORTS OF LIVE BEES[1], 2007 TO 2018



Notes
1 Honey bees only. A small but increasing number of bumblebees are also exported.
2 A package of bees generally consists of 1 kilogram of bees housed within a ventilated cardboard tube or a cardboard and wire screen box about the size of a shoe box. The package may hold a supply of sugar syrup and a queen bee in a cage. All packages and the majority of the queen bees go to Canada. The exporting season is late February to May.
Source: AsureQuality Limited.

been observed in recent years, the supply of beeswax has not kept up with demand. Less wax per tonne of honey is produced nationally due to modern extraction techniques which, due to the thixotropic nature of mānuka honey, require honey prickers/looseners. The addition of honey prickers into the extraction process eliminates the need for uncapping machines greatly reducing the amount of processed wax produced.

The result is another large reduction in export volumes of beeswax from 24 tonnes down to 7 tonnes in the year to 30 June 2018 (Table 6). Export prices for beeswax in 2017/18 remained similar to last year at around $21.00 per kilogram. With the strong domestic demand, it is likely that exports of beeswax could remain low again next season.

Production and sale of bee colonies and hives to other beekeepers

The prices paid for bee colonies increased in the early part of the season to a peak of $2,000 per hive but this peak was short-lived. The drop in non-mānuka honey prices has influenced hive prices, dropping to $1,000 by mid-2018 (Table 7). There may be further downward pressure on hive prices into the 2018/19 season, in particular for any beekeepers wanting to sell hives urgently.

Typically beekeepers buy nucleus colonies (nucs) that generally consist of five frames of bees and three frames of brood and a laying queen, or single box hives that consist of eight to ten frames of bees and six frames of brood with a laying queen. These units ranged in price from $100 for nucleus hives to $600 for single box hives with the higher prices received earlier in the season. Many beekeepers produced nucleus hives especially to sell to expanding enterprises. However, demand for nucs in 2017/18 was not as high as expected because most beekeepers chose to split existing stock rather than buy new hives.

TABLE 6: NEW ZEALAND EXPORTS OF BEESWAX, 2007 TO 2018

YEAR ENDED 30 JUNE	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Export volume (tonnes)	178	106	139	138	160	169	180	148	118	27	24	7
Export value ($ million fob[1])	1.40	1.01	1.36	1.21	1.45	1.59	1.85	1.71	1.57	0.46	0.51	0.14

Note
1 Free on board.
Source: Statistics New Zealand.

OPERATING COSTS (TABLE 7)

Sugar

Beekeepers paid between $800 and $1,400 per tonne dry weight for sugar in 2017/18, a decrease in average price from last year due to world supply of sugar exceeding demand. This has increased the stock of sugar carried from one production period to the next and as a result, may continue to hold the price at relatively low levels into 2018/19.

Beekeepers typically buy sugar in a ready mixed liquid form to avoid purchasing the equipment required to mix large batches, and to allow their beekeeping staff to focus on the core business of hive and crop management. Beekeepers continue to exercise caution around the use of sugar in beehives as many export markets routinely test for sugar adulteration in honey.

Fuel

Fuel prices fluctuated from week to week throughout the season but followed a pattern of steady increases finishing the season around 30 percent higher than at the start. These increases have a considerable effect on beekeeping businesses due to the fact that fuel is a significant cost for migratory beekeeping while at the same time beekeepers are seeing a reduction in returns for many honey types.

The increased reliance on diesel is likely to continue with beekeepers forced to move further afield to secure apiary sites in less crowded areas. Helicopter fuel costs follow the diesel price and this was reflected in an increase in costs for hives flown into remote areas.

Labour

Apiarists remain on Immigration New Zealand's immediate skill shortage list, allowing businesses to recruit skilled beekeepers from overseas.

A number of beekeeping operations reported that they had to reduce full-time staff numbers at the end of the honey extracting season due to downward pressures on profitability over two consecutive years. These beekeepers acknowledge that they face the risk of not finding suitable staff for the coming season.

Apiculture New Zealand has developed a New Zealand Apprenticeship in Apiculture programme with the aim of providing a benchmark in training standards. This training programme is available via the Primary ITO.

Site rentals

The average price paid for apiary site rentals increased in 2017/18, driven by increased competition in particular in the North Island with 63,494 additional hives from the past season.

Most beekeepers pay landowners in honey rather than in cash for rentals of non-mānuka sites. Many landowners regard the honey payments as an appreciation for access on to their land and reporting stock damage to hives, etc. rather than payment for the use of their land.

Smaller local beekeepers, in particular in the North Island, are reporting difficulties in maintaining access to adequate nectar sources. They are experiencing pressure from larger enterprises who are establishing new apiaries close to existing apiaries, and competing aggressively in tendering bids for exclusive access to large land holdings.

Sites that are unlikely to produce monofloral mānuka honey now have significantly less earning potential than in previous years. It may not be financially viable to shift bees over long distances and in some cases, to fly hives into remote areas. Hence some beekeepers may give up existing apiary sites, or renegotiate rental terms where there is lower income potential.

TABLE 7: ESTIMATED EXPENDITURE FOR BEEKEEPING OPERATIONS[1], 2015 TO 2018

YEAR ENDED 30 JUNE			2014/15	2015/16	2016/17	2017/18
Labour	Worker[2]	$ per hour	16-33	16-35	16-36	17-35
	Manager	$ per hour	28-75	30-75	30-75	30-75
	Average working week	hours	45	45	45	45
	Average ratio of hives per fulltime equivalent (FTE) with varroa present in the hives	hives:FTE (pre-varroa)	350:1 (800:1)	350:1 (800:1)	350:1 (800:1)	350:1 (800:1)
Fuel	Fuel (dependant on world price and exchange rate)			Variable		
Sugar	Bulk sugar (variable depending on overseas prices and NZ exchange rate)	$ per tonne	758-1,044	789-1,009	960-1,400	800-1,400
Varroa treatment	Varroa treatment (variable according to hive strength and product(s) used)	$ per hive	22-35	27-31	27-34	17-44
	Varroa strips (applied at recommended rates, two treatments per year)	$ per 1000 plus strips	22-35	23-25	23-27	23-29
Protein supplements	Hives may require 1–2 kilograms per year	$ per 20 kilogram bag	155-163	162-182	160-182	157-209
Contract extraction costs	Extraction of mānuka honey (costs more as the frames must be pricked first to release the honey)	$ per frame	1.06-2.25	1.20-2.25	1.50-2.25	1.50-2.50
	Extraction of clover honey	$ per frame	0.60-1.50	0.60-1.50	1.00-1.50	1.10-1.50
Hives	Perfect condition hive, includes 2 brood boxes, floor, lid and 1 honey super, no bees, assembled and paraffin waxed	$ per hive	226	201	217-235	210-350
	Reasonable condition hive, includes 2 brood boxes and 1-4 honey boxes with bees (including valuations as part of business sale)	$ per hive	600-1,000	780-2,000	700-1,500	1,000-2,000
	Reasonable condition single brood nest hive (no supers)	$ per hive	300-400	560-800	400-600	300-600
	4-5 Frame nucleus hive; new hives includes nuclei box	$ per hive	150-260	200-300	275-300	100-350
	Repairs and maintenance, 7% of hive purchase price	$ per hive	28-42	28-42	28-42	30-44
	Wax to coat plastic frames	$ per kilogram	14-16	...	...	...
	Hive Strappers, used as required	$ per unit	7-11	8-12	6-13	6-14
Bees	Queen bees	$ per bee	30-65	30-40	14-80	20-80
	Select breeder queens	$ per bee	1,000-1,638	900-1,700	600-2,000	3,000-5,000
Protective clothing		$ per suit	139-189	137-169	138-189	159-217
Honey drums	New or re-manufactured honey drum (holds approximately 300kg of honey)	$ per drum	79-100	60-79	64-100	65-100
Apiary rentals paid to landowners	Mānuka sites (rental is paid either as a per hive rate, percentage of crop when sold or a combination of both)	$ per hive	50-130	75-150	50-250	50-400
		$ per apiary	500-1,000	500-1,000	500-1,000	500-1,400
		% of crop	10-30	10-45	10-45	10-45
		$ per hive + % of crop	$25-60 10-38%	$60-100 10-40%	$50-100 10-40%	$50-150 10-40%
	Non-Mānuka sites	grams per hive		Variable, often 500		
Compliance costs	Risk Management Programme (RMP) annual audit costs	$ per audit for a processing RMP	up to 1,350	up to 1,400	up to 1,500	up to 1,600
		$ per audit for a storage RMP	up to 795	up to 895	up to 1,000	up to 1,000
	MPI Food Safety annual fees	$ if require export eligibility	590	...	1,006	1,006
	MPI Beekeeper Listing	$ application fee	n/a	n/a	155.00	155.00
		$ renewal fee	n/a	n/a	77.50	77.50
	Auditing of electronic certificates	$ per eligible document	up to 67	up to 70	up to 70	up to 70
		$ per month auditing 10% of eligibility declarations raised	up to 67	up to 70	up to 70	up to 70
	Tutin tests	$ per sample (first sample)	90-125	80-125	80	60-90
		$ per composite (up to 10 samples can be composited)	10-15	10-15	10	15-17
	American Foulbrood Pest Management Plan Levy	$ per beekeeper	20	20	20	20
		$ per apiary	14	14	15.17	15.17
Apiculture New Zealand	Non-Commercial (1-25 hives)	Annual subscription	n/a	86.25	86.25	86.25
	Commercial (26+ hives)	Base fee	n/a	172.50	172.50	172.50
		$ per hive	n/a	1.15	1.15	1.15
	Beekeeping Clubs	Annual subscription	n/a	230	230	230
	Packers and Processors	Base fee	n/a	172.50	172.50	172.50
		$ per kilogram of production	n/a	0.0345	0.0345	0.0345
	Health Product & Food Manufacturers	Base fee	n/a	172.50	172.50	172.5
		$ per kilogram of production	n/a	0.115	0.115	0.115
	Affiliate Industry (e.g: supply companies etc)	Annual subscription	n/a	460	460	460

Notes
... Data not available.
n/a Not applicable.
1 Expenses are exclusive of GST.
2 The highest hourly rates for workers will involve supervisory and some management responsibilities.

Source: AsureQuality Limited.

TABLE 8: MPI-FUNDED APICULTURE AND HONEY PROJECTS

PRIMARY GROWTH PARTNERSHIP	**HIGH-PERFORMANCE MĀNUKA PLANTATIONS** (ended 30 September 2018) This PGP Programme led by Manuka Research Partnership (NZ) Limited aims to move mānuka honey production for medical use from wild harvest to science-based farming of mānuka plantations. Combining improved genetics with optimum husbandry practices could enable significant gains for New Zealand's mānuka honey industry. **https://www.mpi.govt.nz/funding-and-programmes/sustainable-food-and-fibre-futures/primary-growth-partnership/current-pgp-programmes/high-performance-manuka-plantations/**
SUSTAINABLE FARMING FUND	**OPPORTUNITIES OF SHELTERBELTS IN FARMING SYSTEMS** (starting July 2019) This project will investigate the benefits, opportunities and challenges of sheterbelts in pastoral systems and support their further adaptation.
	TREES FOR BEES: BUILDING BEE CAPACITY FOR SUSTAINABLE RURAL GROWTH (starting July 2019) Building bee capacity by training people to plant for bees, enabling nurseries to supply bee plants and providing tools to design bee plantations. **http://www.treesforbeesnz.org/home**
	TREES FOR BEES: Strategic bee plantations for pollination and honey (in progress) The aim of this project is to support the development of the wider agricultural sector to achieve sustainability and growth targets, through increased honey and related medical product exports, and by improved pasture, horticulture and arable crop pollination helping drive growth. This will be achieved by having healthy and thriving bee populations through focussed research on floral pollen and nectar sources that meet bee nutrition requirements at the right time and in sufficient quantity, and strategic bee plantations that enable apiarists, farmers and landowners to ensure year-round bee feed supplies. These outcomes will be delivered through demonstration farms, workshops and field days and employ a suite of extension tools developed during the project. **http://www.treesforbeesnz.org/home**
	TREES FOR BEES: Producing abundant bee pollinators for sustainable farming (completed February 2017) This project aims to increase the number of strong, healthy honey bees to ensure pollination services for agricultural crops. In many areas, pollen and nectar sources are being removed leading to poor nutrition for bees. They become weakened, malnourished and sometimes starving. To restore flowers for bees we are installing demonstration plantations of trees and shrubs to show how to supply a steady source of high-protein pollen to support bee colonies. The result will be more bees for pollination services leading to increased crop and pasture yields. **http://www.treesforbeesnz.org/research/project-4-producing-abundant-bee-pollinators-for-sustainable-farming**
	ABATE: ACTIVE BACTERIOPHAGES FOR AFB ERADICATION (in progress) American Foulbrood (AFB) is caused by a bacterial pathogen of honeybees, *Paenibacillus larvae*. Antibiotics use in hives is prohibited in New Zealand and hives with signs of infection must be destroyed immediately. Bacteriophages (phages for short) are simple viruses that kill specific bacteria. They are highly abundant, estimated at 1031 globally. Previous work abroad indicates that our AFB pathogens in New Zealand are susceptible to destruction by a set of specific bacteriophages that thrive in healthy hives and nearby soil. We will isolate native New Zealand phages for *P. larvae*. These will be completely sequenced to determine if they are safe for use and can be combined to produce a bio-protective phage cocktail for field testing. This project provides the groundwork study for an innovative approach to naturally protecting NZ beehives against AFB. **http://www.massey.ac.nz/massey/about-massey/news/article.cfm?mnarticle_uuid=07931996-67EA-45BF-82FE-7587F3608127**
	PROJECT CLEAN HIVE (in progress) American foulbrood (AFB) is a notifiable disease of the New Zealand honey industry. As the industry is expanding exponentially, both through commercial businesses and hobbyists, increasing incidence of AFB is a growing risk. Otago and Southland beekeepers have identified the opportunity available to them to pilot some innovative solutions. This project will run a pilot study to test whether the current testing methods can be calibrated with the proposed new tests (qPCR and detection dogs) to provide cost effective tools for detection and management of AFB at the pre-clinical stage. If successful, this will provide new opportunities for improved disease identification and control of AFB to help prevent the impact and spread of a notifiable disease. The pilot study outcomes and the lessons learned will be shared with the wider industry.
	COMBATING THE GIANT WILLOW APHID (in progress) Willows are highly valued in New Zealand as early season nectar and pollen sources critical to the spring growth of honeybee colonies, and for soil erosion control and riverbank stabilisation. The giant willow aphid (GWA), an invasive exotic species first reported in New Zealand in December 2013, is now found throughout New Zealand and is causing a cascading series of impacts. Infestation causes tree stress that reduces willow health and productivity. Aphids secrete large quantities of honeydew, rich in melezitose sugar that is readily collected by bees and introduced vespulid wasps. Melizitose-enriched honey crystallises within the hive, resulting in a significant volume of honey being either rendered non-extractable or tainted by the melezitose. This programme responds to an urgent widespread need from various industry groups by tackling three areas: 1) the economic impact of GWA, 2) identifying GWA resistant willow cultivars, and 3) determining options for biological control of GWA.
	ALTERNATIVE POLLINATORS FOR SEED PRODUCTION (in progress) This project aims to develop managed fly species that can be mass reared to provide sufficient and predictable pollination to a range of field and covered crops to maximise economic yields.

SUSTAINABLE FARMING FUND	**CLASSICAL BIOLOGICAL CONTROL FOR *VESPULA* WASPS – Phase II** (in progress) *Vespula* wasps are a serious invasive pest throughout New Zealand, causing direct economic losses and putting labourers at risk in various primary sectors. Biocontrol can offer a sustainable large-scale long-term control solution to complement current and future methods. This project will explore the potential of natural enemies, import the proposed parasitic flies, test their safety, apply to the EPA for release approvals and if approved, make initial releases. **http://www.landcareresearch.co.nz/science/plants-animals-fungi/animals/invertebrates/invasive-invertebrates/wasps/wasp-biocontrol-updates**
	New mite for biological control of *Vespula* wasps (completed October 2017) European wasps of the genus *Vespula* are now a serious invasive pest throughout New Zealand, causing direct economic losses and putting labourers at risk in various primary sectors. A recent review concluded that available control options offer limited relief, and are restricted in range. Biocontrol, on the other hand, can offer a sustainable long-term solution that will complement current control methods. In addition to providing large-scale long-term control, biocontrol is environmentally-safe and highly cost effective in the long-run. This project will explore the potential of a new mite recently discovered in wasp nests as a biocontrol solution for *Vespula* wasps. Using lab studies we will develop the mite as a safe and effective biocontrol tool. Field surveys will be conducted to determine the spread and impact of the mite on wasp populations. **http://www.landcareresearch.co.nz/science/plants-animals-fungi/animals/invertebrates/invasive-invertebrates/wasps/wasp-biocontrol-updates**
	A COLLABORATIVE INDUSTRY APPROACH TO REDUCE THE THREAT OF PAS IN HONEY Phase 2: Risk modelling and mitigation in the supply chain (in progress) The presence of pyrrolizidine alkaloids (PAs) in honey represents a food safety and market access threat. Building on a previous Sustainable Farming Fund project, this project will identify mitigation strategies and a potential testing regime that is appropriate for the industry to continue to grow its international presence and position. A proactive response and industry selfregulation will ensure that New Zealand honey is positioned to meet any future national and international regulations related to PAs and that market access is not limited, and that the public perception of New Zealand honey continues to be 'honey is healthy for you'.
	A collaborative industry approach to reduce the threat of pyrrolizidine alkaloids in honey (completed August 2016) The Bee Products Standards Council (BPSC) is undertaking a significant research project to ensure that New Zealand honey remains a safe food.
OTHER MPI FUNDED PROJECTS	**NEW ZEALAND COLONY LOSS SURVEY 2015** (completed) Funded by the National Beekeepers Association of New Zealand, Federated Farmers Bee Industry Group, Agcarm and the Ministry for Primary Industries. **www.landcareresearch.co.nz/science/portfolios/enhancing-policy-effectiveness/bee-health**
	NEW ZEALAND COLONY LOSS SURVEY 2016 and 2017 (completed) A continuation of the 2015 New Zealand Colony Loss Survey (see above) and funded by the Ministry for Primary Industries. Specifically addresses the differences between regional rates of colony losses. **www.landcareresearch.co.nz/science/portfolios/enhancing-policy-effectiveness/bee-health**
	NEW ZEALAND COLONY LOSS SURVEY 2018 (completed) A continuation of the 2015, 2016 and 2017 New Zealand Colony Loss Survey (see above) and funded by the Ministry for Primary Industries. Specifically addresses the presence of any statistically significant trends in colony losses over the four years to date. **https://www.mpi.govt.nz/growing-and-harvesting/honey-and-bees/bee-colony-loss-survey/**
	BEE PATHOGEN PROGRAMME (completed) The Bee Pathogen Programme is the most detailed cohort study ever conducted in New Zealand, funded by Operational Research Funds by the The Ministry for Primary Industries. The same 60 apiaries were followed from September 2016 to March 2019. This programme is discovering (i) how common pests and diseases are in New Zealand apiaries using international best practice sampling and analysis protocols, (ii) new evidence-based protocols for sampling and testing pests and diseases in New Zealand honey bees, (iii) how apiary management is affecting varroa mite counts, trypanosome infection levels, AFB incidence, and the prevalence of Nosemas and viruses in New Zealand apiaries, and (iv) the relative influence of these pathogens on hive productivity and colony survival. **https://www.mpi.govt.nz/protection-and-response/readiness/bee-pathogen-programme/**

INFORMATION ABOUT THE REPORT

This report was developed from information gathered through surveys completed by beekeepers, honey packers and exporters and augmented with a review of export documents, published reports and publically available data from Statistics New Zealand.

Aggregated data on the number of registered beekeeping enterprises, apiaries and hives under the National American Foulbrood Pest Management Plan are reported with the permission of the Management Agency for the National American Foulbrood Pest Management Plan.

Honey production, price and expenses figures are based on a survey of a range of beekeeping enterprises that account for approximately 30 percent of registered hives in New Zealand. The survey is administered by AsureQuality Limited during its annual Risk Management Programme audits and/or hive audits, and via targeted interviews.

Surveys record honey crop information based on the beekeeper enterprise location, not apiary (or hive) locations. This means that honey production information is recorded against where the honey is extracted, not harvested. Therefore, with the increasing trend of migrating hives long distances to harvest mānuka, in particular in the North Island, honey production is being reported for the North Island and South Island only.

The data recorded in the surveys are extrapolated to provide an estimate of national honey production, prices ranges for honey and honey products, and expenses for beekeeping operations.

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