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**THE VALUE OF HONEY BEES TO NEW ZEALAND'S
PRIMARY PRODUCTION.**

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1 SUMMARY

A conservative estimate of the value of the honey bee's contribution to New Zealand agriculture is \$2,275 million per year, made of \$2,255 million from pollination activities and nearly \$20 million from bees and bee products. Thus the honey bee's pollinating activities are worth approximately 113 times more than the value of bees and bee products sold by beekeepers.

Honey bees provide a vital pollination service to New Zealand agriculture and horticulture, which has been the primary justification for much of the support provided by government agencies to the beekeeping industry. It is recognised that an adequate population of honey bee pollinators can only be maintained in the context of a thriving beekeeping industry, though the industry's tangible products (honey and beeswax) are worth only a fraction of the value of the pollination service provided.

2 INTRODUCTION

Honey bees are generally regarded as providing a valuable pollination service to New Zealand agriculture and horticulture. The value of this service has not previously been quantified, and this paper attempts an analysis of such benefits.

United States researchers have assessed the value of honey bee pollination there to be approximately 100 times greater than the value of honey and wax produced (McGregor, 1976). A more recent analysis has shown the pollination value of honey bees to be worth 143 times as much as honey and beeswax production (Levin, 1983).

In New Zealand rather different types of agriculture and horticulture are practised, so a separate study is warranted.

The contribution made by honey bee pollination to New Zealand's primary production is made up of several components:

- nitrogen fixation by legumes which are dependent on bee pollination.
- fruit and vegetable crops which rely on bee pollination for economically viable production.
- crops which require bee pollination to produce their seed.

The following analysis is only a brief calculation of the worth of honey bee pollination in New Zealand. In order to err on the side of conservatism, and because of the types of data available, we have considered only export agricultural and horticultural

crops (with one exception). The total value of bee products has been included, however, and the net effect of these decisions will be to make the benefit ratio in section 1 above somewhat conservative.

3 HORTICULTURE

The following crops are reliant on honey bee pollination to produce commercial crops. While additional pollination agents such as wind and other insects are involved, without honey bees production of these crops is not economically viable.

Crop	Annual export value (\$ million f.o.b.)		Reference
Kiwifruit	\$295	432.5	4
Apples and pears	\$117	127.2	7
Berryfruit (fresh & frozen)	\$ 34	11.4	4
Stonefruit	\$ 5	9.5	4
Citrus	\$ 3	1.3	4
Misc subtropicals	\$ <u>1</u>	<u>3.5</u>	4
	\$455	\$585.4	

These figures include fresh and some frozen fruit exports, but do not include the value of further-processed products such as juices or canned fruit.

4 VEGETABLES

The most important vegetable produced in New Zealand which requires pollination is squash.

	Annual export value (\$ million f.o.b.)	Reference
Squash	\$36	4

Many other vegetables do not need to be pollinated, but arise from seeds for which pollination is necessary. Much of this seed is imported to New Zealand, except onion seed, so only the value of our onion exports is included in this category.

	Annual export production (\$ million f.o.b.)	Reference
Onion	\$8	4

Fruit Stats in Hort's News Yearbook 1988 - → to
June 1987. P 36.

5 SEED CROPS

Most vegetable seed crops require pollination, and honey bees are the predominant pollinator.

	Annual export production (\$ million f.o.b.)	Reference
Vegetable seed	\$1	7

In 1984 9,300 tonnes of machine-dressed clover seed was produced in New Zealand (8). No information is readily available on the proportions of red and white clover seed in this. Although a proportion would be red clover seed (value \$2.80/kg), for the purposes of this paper a conservative estimate of \$1.00/kg is assumed (the value of white clover seed)

	Annual value of production (\$ million)	Reference
Clover seed	>\$9	4

6 PASTURE LEGUMES AND ANIMAL PRODUCTION

The most significant impact of honey bees on New Zealand's agricultural production is through pollination of the legumes on which our pastoral systems depend. Although clovers are perennial, seeding is still necessary to maintain an adequate seed reservoir to sustain the clover content in pasture, particularly in harsh environments where winter kill is significant.

It is estimated that clovers fix an average of 185 kg/ha of nitrogen per year in New Zealand pastures (Ball et al., 1979). Using this figure an estimate can be made of the replacement cost to farming, if this nitrogen had to be applied artificially.

Area of improved pasture in New Zealand	9.4 million ha
N-fixation by clovers (average)	<u>185 kg/ha/yr</u>
Total nitrogen fixing	1.74 million tonnes/yr
Urea equivalent (46% N)	3.78 million tonnes/yr

Cost to apply urea

urea	\$416/tonne
freight	\$16/tonne

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