

IMPORTS continued						
Hong Kong	---	---	---	7,776	49,248	51,399
Israel	---	---	---	8,339	26,861	28,515
Italy	2,316	19,265	19,809	7,402	38,385	41,217
Malaysia	---	---	---	41,412	90,000	95,300
Portugal	---	---	---	4,040	9,472	9,829
Romania	---	---	---	39,622	118,747	126,247
Mexico	20,160	35M546	35M549	719,487	1,749,944	1,770,696
Poland	---	---	---	9,327	20,682	21,769
Spain	618	2,976	3,058	618	2,976	3,058
Switzerland	2,543	25,553	26,793	21,774	192,511	201,824
Taiwan	---	---	---	30,579	100,746	102,543
Thailand	---	---	---	18,000	29,700	30,528
Turkey	---	---	---	600	4,200	4,642
United Kingdom	---	---	---	394	3,243	3,719
Vietnam	---	---	---	117,000	117,925	139,245
<b>SUB-TOTAL</b>	<b>99,966</b>	<b>211,242</b>	<b>218,027</b>	<b>1,715,518</b>	<b>3,589,380</b>	<b>3,755,632</b>
<b>GRAND TOTAL</b>	<b>9,912,373</b>	<b>14,185,491</b>	<b>15,321,229</b>	<b>68,490,503</b>	<b>113,997,716</b>	<b>121,833,678</b>

\* Excluding Cook Islands, Niue and Tokelau

SOURCE: Department of Commerce, Foreign Trade Division

## Pacific Northwest Honey Bee Pollination Survey – 2004

BY: Michael Burgett, Professor Emeritus

Department of Horticulture; Oregon State University, Corvallis, OR 97331

Since 1986 the Honey Bee Laboratory at Oregon State University has conducted an annual survey of pollination economics in the Pacific Northwest (PNW). The information from each year of the survey has been made available both regionally and nationally. The information has proved to be valuable to individual beekeepers that generate income from pollination rental.

The use of managed honey bee colonies for commercial crop pollination remains the most important function of the PNW beekeeping industry. The vast and diverse agriculture of the PNW relies on a healthy and strong beekeeping industry to maintain optimum production. An enhanced knowledge of pollination economics is critical to every beekeeper that enters into the world of commercial crop pollination. It is also important for those growers who contract honey bee colonies for managed pollination to understand current economic conditions of the beekeeping industry.

The pollination requirement for commercial agriculture in the PNW is enormous. Between Washington, Oregon and Idaho there are 355,000 acres of crops grown that require or benefit from managed honey bee pollination. The "farm-gate" value of those combined crops for the production year 2003 was \$1,683,600,000! Nearly half of those acres and 60% of the dollar value are in one crop – apples.

The USDA National Agriculture Statistical Service estimates that there are 200,000 production honey bee colonies in the PNW. And with these numbers there are some interesting hypothetical calculations that can be made. Each grower renting 2 colonies for each acre of blooming crop (355,000 acres) would produce a rental requirement of 710,000 colonies. If we multiple this by the 2003 average colony rental fee (\$36) it results in a potential pollination rental income for beekeepers of more than 25 million dollars. If we add to that the combined hypothetical almond pollination income (ten million dollars) we end up with a gross pollination income of 35 million dollars for PNW commercial pollinators. Another way to look at this is how much pollination income should be produced from one commercial colony in one year? That figure is \$175.

Comparing the hypothetical PNW rental income (25 million \$) to the farm-gate value of the crops pollinated in the PNW (1.7 billion \$) shows that the money spent by growers to insure adequate pollination is 1.5% of the value of total crop production. This is another rather dramatic illustration of what a good value colony pollination rental is to PNW commercial agriculture.

This year's survey provides data that continue to show a number of trends, one of which is the dependence of PNW commercial beekeepers on the income generated from colony rentals. For 2004 the average commercial beekeeper reported receiving 55% of his or her annual operating gross from pollination rentals, which is similar to the figure reported for 2003, and is down slightly from previous survey results. This reduction in the dependence on pollination rental income has likely been influenced by the dramatic increase in the wholesale price of honey seen in 2002 and 2003. While the wholesale price of honey was down in 2004 compared to the previous two years, it is still higher than what was paid prior to the Chinese fiasco of honey tainted with antibiotic residues.

One concern for the segment of agricultural industry that requires managed pollination, is that the recent phenomenon of increased honey prices will reduce the number of colonies available for pollination rental. That this has happened has yet to be shown, but for 2003 and 2004 it is obvious that the income percentage from honey sales has increased and correspondingly, the percent of income from pollination rental has decreased, a result primarily from increased honey prices, not a decrease in the level of pollination colony rental activity. However that might be changing. Very dramatic increases for almond pollination rental fees are being reported for the 2005-pollinating season. Almond growers are responding to a potential shortage of colonies available in 2005.

Many Commercial beekeepers in the PNW and elsewhere, are observing serious autumn and early winter colony losses. While the exact nature of these losses is unknown at this time, it is suspected that widespread failure of EPA registered miticides is responsible.

For 2004 the average pollination rental fee, computed from commercial beekeeper rentals on all crops reported, was \$38<sup>65</sup>. This is an increase of \$2<sup>20</sup> (6%) from the average pollination fee charged in 2003 (\$36<sup>45</sup>) (see Table 1 and Figure 1).

In past years commercial beekeepers have been responsible for 99% of all reported pollination rentals and a corresponding 99% of all pollination income. The data from semi-commercial beekeepers for 2004 were so insignificant that it would be improper to estimate their role in overall pollination rentals. Assuming no dramatic change in the population of semi-commercial beekeepers, they still are minor players in the overall pollination situation for commercial agriculture throughout the PNW.

For a commercial beekeeper the gross amount of income generated from pollination rental leveled off in 1997 and 1998, but increased in 1999 (\$183,780). For 2004 this figure was calculated to be \$265,185. The increase results largely from the increasing size of the average commercial operation.

During the past ten years the average rental fee has increased from \$29<sup>60</sup> (1995) to \$38<sup>65</sup> (2004). It needs to be stressed that honey bee colony rental has for many decades been an underpaid service to the agricultural industry. It is really only within the past ten years that rental fees have begun to more accurately reflect the enormous value-added service of managed pollination. This is shown by the 110% increase in the average pollination fee during the last fifteen years; 1990 = \$18<sup>40</sup> to 2004 = \$38<sup>65</sup>.

In 2004, for crops pollinated in the PNW, cucumber pollination once again provided the highest average fee at \$46<sup>70</sup> per colony rental. The cucumber "average" is calculated from the five corresponding beekeepers reporting cucumber pollination. In terms of acreage, apples are the largest crop grown in the region and this is reflected by the large number of reported rentals (13% of all rentals and 9% of the total reported rental income.) For 2004 more commercial beekeepers reported pollinating sweet cherries than in previous surveys. Sweet cherries accounted for almost 20% of the total rentals and 17% of pollination income.

Berry crops (blackberries, raspberries and blueberries), which as late spring to early summer bloomers and copious nectar producers (blackberries and raspberries), often produce honey crops as well as pollination fees. The 2004 average pollination fee for all combined berry crops was \$27<sup>30</sup>.

The average PNW commercial honey bee colony was rented 1.93 times in 2004 and this includes California almonds. This is a slight decrease from the past several years. This statistic had been dropping since 1999 when the average number of rentals per colony was 2.77. Does this actually reflect the real world situation? Are commercial beekeepers concentrating on almonds and PNW tree fruit (which historically provide the major sources of pollination income) and reducing the number of colonies involved in minor crop pollination? At this time our data are not able to provide a reasonable answer to this question.

For the 2004 pollination season an average rental fee of \$38<sup>65</sup>, combined with an average of 1.93 pollination sets per colony, results in an annual per colony pollination income of \$74<sup>60</sup>, which is down from the 2003 colony income statistic of \$86<sup>40</sup>. And with the "average" commercial operation running 3,555 colonies, a hypothetical gross pollination income for the "average" commercial beekeeper was \$265,200 in 2004.

The combined colony numbers from those commercial beekeepers that responded to the 2004 survey, (53,345 hives), represent about one-half of the USDA's estimate of colony numbers in Oregon and Washington. Therefore, if we multiply the reported pollination income reported by beekeepers responding to the survey (\$3,979,300) by a factor of 2, we have a ballpark estimate of the pollination income generated by commercial beekeeping in the PNW, *i.e.*, a regional pollination income of approximately \$8,000,000. This is far more than the normal "estimates" assigned to the bee industry by agricultural economists, who, for reasons unexplained, usually do not include pollination rental income in their estimates of the beekeeping industry economic status. Pollination income in the PNW far exceeds the value of honey and wax sales for our regional beekeeping industry. Pollination rental income is frequently four to five times greater than honey and wax sales in any given year.

A new question in the 2004 survey asked commercial beekeepers to report the total number of full-time or full-time equivalent employees working for their operations. That figure for the "average" commercial beekeeping operation is 2.9 full-time employees. Another interesting way to look at this is would be to ask the question "what is the 'colony equivalent'", meaning what is the average number of colonies necessary to hire one full-time employee. That figure is very close to 1,500 colonies/employee.

While colony income from pollination rental is a critical statistic, so therefore is the annual cost to maintain a healthy hive of honey bees. Responses to this question on the survey have varied widely, often from a misunderstanding of what was being asked. However, numerous commercial beekeepers, which have over the years maintained good cost accounting records, have responded with numbers that are very reasonable relative to today's economy. The average annual hive maintenance cost was \$99 per colony for the year 2004 (highest reported per colony maintenance cost = \$150; lowest = \$60). This is down from recent years (\$112 for 2003). It is very doubtful that maintenance costs are going down at a time of increasing operating costs, so this "average" cost per colony should not be taken as a statistically rock solid figure. It also suggests that beekeepers should try to be more precise in calculating their operational costs.

It is very important to recognize that the average colony maintenance cost is higher than the average per colony pollination income. From the 2004 survey, pollination income was \$74<sup>60</sup>/colony and the colony maintenance cost was \$99; a difference of \$24<sup>40</sup> per colony. This illustrates that operation profits are generated by sources of income outside of pollination rental, most importantly, honey production. Depending on when you sold or contracted your honey in 2004, the wholesale price was from a low of \$0<sup>85</sup> to as much as \$1<sup>35</sup> per pound. Basing wholesale honey prices at a conservative \$1<sup>10</sup> per pound, the average commercial hive had to produce about 22 pounds of honey per colony in order to break even.

Remember that the data presented here represent the pollination rental situation of a hypothetical "average" commercial beekeeper in the Pacific Northwest. For individual beekeepers the survey results are most useful as benchmarks against which they should compare their individual operations. Please let me stress again that all of these "projections" are only as accurate as the data provided by responding beekeepers. The projections also assume that the participating beekeepers collectively represent the mainstream of commercial beekeeping in the Pacific Northwest.

I wish to again thank all those beekeepers in Oregon and Washington who took the time to participate in the survey, which over the past nineteen years has generated the most accurate assessment of commercial pollination known in the U.S.

**Table 1. Average Pollination Fee 1993-2004**

<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>
22.50	28.10	29.60	31.55	31.05	29.65	32.25	32.85	33.65	36.40	36.45	38.65

**Table 2. 2004 Average Commercial Pollination Fees by Crop (responding commercial beekeepers)**

<u>Crop</u>	<u>No. Rentals</u>	<u>Average Fee</u>	<u>Income(\$)</u>
Pears	7,394	\$31 <sup>30</sup>	231,525
Cherries	20,305	\$33 <sup>65</sup>	683,560
Apples	13,019	\$28 <sup>25</sup>	367,800
Berries <sup>1</sup>	2,753	\$22 <sup>90</sup>	63,030
Blueberries	2,632	\$31 <sup>85</sup>	83,823
Cranberries	32	\$24 <sup>00</sup>	768
Vegetable seed	5,768	\$37 <sup>95</sup>	218,772
Clover seed <sup>2</sup>	897	\$32 <sup>60</sup>	29,220
Crimson clover seed	2,120	\$0 <sup>85</sup>	1,800
Radish seed	414	\$24 <sup>10</sup>	9,980
Cucumbers	1,491	\$46 <sup>70</sup>	69,615
Sq. & Pump. seed	539	\$31 <sup>80</sup>	17,127
Watermelon	1,216	\$34 <sup>55</sup>	42,020
Misc. <sup>3</sup>	24	\$32 <sup>00</sup>	768
Almonds	44,339	\$48 <sup>70</sup>	2,159,012

**SUMMARY = 102,943 rentals generating \$3,979,3000 - - - Average Pollination Fee = \$38<sup>65</sup>**

<sup>1</sup>Includes blackberries, raspberries, Marionberries, & Loganberries.

<sup>2</sup>Includes red & white clover as grown for seed. <sup>3</sup>Plums.

**Table 3. Average colony numbers, average rental fee per hive, and average annual rental income per hive for a commercial beekeeping operation in the Pacific Northwest 1992-2004.**

<u>Year</u>	<u>Average No. Colonies</u>	<u>Average Rental Fee</u>	<u>Average Annual Rental Income per Colony</u>
1992	765	\$19 <sup>25</sup>	\$49 <sup>70</sup>
1993	990	\$22 <sup>50</sup>	\$62 <sup>25</sup>
1994	1,225	\$28 <sup>10</sup>	\$78 <sup>70</sup>
1995	1,348	\$29 <sup>60</sup>	\$78 <sup>15</sup>
1996	1,350	\$31 <sup>55</sup>	\$97 <sup>50</sup>
1997	1,504	\$31 <sup>05</sup>	\$92 <sup>20</sup>
1998	1,153	\$29 <sup>65</sup>	\$83 <sup>00</sup>
1999	2,058	\$32 <sup>25</sup>	\$89 <sup>30</sup>
2000	2,055	\$32 <sup>85</sup>	\$77 <sup>40</sup>
2001	3,168	\$33 <sup>65</sup>	\$64 <sup>60</sup>
2002	4,255	\$36 <sup>40</sup>	\$63 <sup>75</sup>
2003	2,612	\$36 <sup>45</sup>	\$86 <sup>40</sup>
2004	3,555	\$38 <sup>65</sup>	\$74 <sup>60</sup>

### Summary Information - 2004

Total number of participating commercial beekeepers = **15**

Total number of colonies in the survey = **53,345**

Total colony rentals = **102,943**

The average per colony pollination rental fee (for all beekeepers, for all crops including California almonds) was: **\$38<sup>65</sup>**

The average commercial colony was placed in **1.93** pollination sets in 2004, for an average per hive rental income of **\$74<sup>60</sup>**

The average commercial bee operation maintained **3,555** colonies and grossed **\$265,200** in pollination rental income for 2004.