

Pacific Northwest Honey Bee Pollination Survey – 2001/2002

By Michael Burgett, Professor Emeritus

Department of Entomology - 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). An annual report was not published for the pollination year 2001, so this year's report will include data from both 2001 and 2002.

With each year's information, the strength and importance of our region's beekeeping industry is highlighted. All participants in a regional agricultural industry need to understand the critical role played by beekeeping in overall agricultural production. This is especially true today with the increased costs and problems caused by the presence of honey bee mite parasites and the expanding geographical range of our European honey bee's tropical "cousin" the Africanized honey bee, now well established southern California, as well as Texas, New Mexico, Arizona and Nevada.

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.

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 2001/02 the average commercial beekeeper reported receiving 70% of his or her annual operating gross from pollination rental. I am aware of no region in the U.S., or the world for that matter, where the rental of honey bee colonies for pollination is of such importance to the economic survival of a regional beekeeping community and of such benefit to the agricultural base that requires insect pollination for optimizing product yield. Even in California, the state with the largest and most varied beekeeping industry in the U.S., pollination rental income is just slightly over 50% of operational revenues (California State Beekeepers' Association 2000 pollination rental survey).

Ever since the arrival of the tracheal mites and varroa brood mite the average size of an individual commercial operation has increased. This is a reflection of higher colony mortality and the need to maintain adequate colony numbers for pollination contracts. The mite "plague" effectively eliminated marginal beekeeping operations & those that remained needed to become larger in order to fulfill the need for rental colonies by the at-large agricultural base in the PNW and in California.

As in past years, the 2001/02 surveys were sent to all Washington and Oregon beekeepers that registered more than 25 colonies with their respective state agriculture departments. A total of 14 commercial beekeepers returned completed surveys. These individual beekeepers collectively owned 59,576 colonies. A total of 104,322 colony rentals were reported for all respondents, which produced \$3,799,814 in rental income for the participating beekeepers.

For 2002 the average pollination rental fee, computed from commercial beekeeper rentals on all crops reported, was \$36⁴⁰. This is a \$2⁷⁵ (8%) increase from the average pollination fee charged in 2001 (\$33⁶⁵) (see Table 1 & Figure 1). The 2002 average rental fee is nearly an 11% increase from the 2000 average of \$32⁸⁵ (the last published figure.)

Commercial beekeepers were responsible for 99% of all reported pollination rentals and a corresponding 99% of all pollination income. This is very similar to past years and shows how dominant commercial beekeepers are in the arena of large-scale agricultural pollination and what a minor role is played by semi-commercial beekeepers in contributing to the regional pollination requirement.

The average pollination rental fee for semi-commercial beekeepers for the 2002 season was \$30³⁵, which was significantly lower than that charged by commercial beekeepers (\$36⁴⁰.) For semi-commercial beekeepers the average annual per colony pollination income was \$37⁴⁰. A semi-commercial colony, on average, was rented for 1.23 sets in 2002 which accounts for the difference in the per colony income generation compared to a commercial hive.

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 2002 this figure was calculated to be \$271,213. This dramatic increase results largely from the increasing size of the average commercial operation.

During the past eight years the average rental fee has increased from \$28¹⁰ (1994) to \$36⁴⁰ (2002). 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 decade that rental fees have begun to more accurately reflect the enormous value-added service of managed pollination. This is shown by the 98% increase in the average pollination fee during the last twelve years; 1990 = \$18⁴⁰ to 2002 = \$36⁴⁰.

Within the PNW, tree fruits are the dominant crops for pollination income (see Table 3). In 2002 the combination of pears, sweet cherries and apples accounted for 55% of all reported rentals and 48% of all reported pollination income. Paradoxically, the single most important crop for PNW beekeepers is grown in California, *i.e.*, almonds. Almonds were responsible for 36% of all rentals and 44% of all

rental income in the 2002 survey. Almonds possessing the highest average pollination fee reported for 2002 (\$45⁰⁰). More than 95% of all commercial colonies in Oregon and Washington are taken to California for almond pollination. In 2002 the combination of almonds and tree fruit accounted for 90% of all rentals and 92% of pollination income, which illustrates the dominance and importance of these crops for a commercial PNW beekeeper.

In 2002, for crops pollinated in the PNW, cranberries pollination provided the highest average fee at \$39⁰⁰ per colony rental. In terms of acreage, apples are the largest crop grown in the region and this is reflected by the large number of reported rentals (44% of all rentals and 40% of the total reported rental income.)

The crops with the lowest pollination fees are the legumes crimson clover and hairy vetch, both of which are grown as seed crops but are also traditional honey producers, hence historically low fees. Their significance to regional pollination income is very minor, in terms of rental income, the number of colonies involved, and the very regional nature of both crops (mid- to northern Willamette Valley).

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 2002 average pollination fee for all combined berry crops was \$23⁷⁵.

The crop with the most remarkable change from the late 1990^{ies} is meadowfoam. For 2002 only one beekeeper reported colony rentals on meadowfoam, which compares to 21 beekeepers with 3,830 rentals reported in 1999. The reason is simple, very little meadowfoam is now being grown due to major financial disruptions in the meadowfoam industry within the Willamette Valley.

The average PNW commercial honey bee colony was rented 1.75 times in 2002 and this includes California almonds. This is a decrease from the 1.92 figure generated from the 2001 survey. This statistic has been dropping for the past four years; in 1999 the average number of rentals per colony was 2.77 times during the pollination season. 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?

For the 2002 pollination season an average rental fee of \$36⁴⁰, combined with an average of 1.75 pollination sets per colony, results in an annual per colony pollination income of \$63⁷⁰, which is an 29% decrease from the 1999 colony income statistic of \$89⁷⁰. This trend of reduced per colony rentals, along with the accompanying reduced per colony income result in a lessening, or at least a stagnation in pollination "effort" on the part of regional beekeepers. Agriculture at-large is presently experiencing serious financial problems, and one needs only look to the apple and cranberry industries to see this. Beekeepers have been reluctant to implement increased pollination fees to an already stressed agriculture industry within the PNW.

The combined colony numbers from those commercial beekeepers who responded to the 2002 survey, (59,576 hives), represent at least one-fourth to perhaps as many as one-third of the commercial hives in Oregon and Washington. Therefore, if we multiply the reported pollination income (\$3,799,814) by a factor of 4 and 3, we have a ball park estimate of the pollination income generated by commercial beekeeping in the PNW, *i.e.*, a pollination income perhaps as low as \$11,000,00 to a reasonable high of \$15,000,000. 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 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.

An added question to the survey in 2001 and again in 2002 was how frequent is the use of written pollination contracts between beekeepers and their respective growers. In both years the responses were very similar. It appears that using written contracts is the unusual case. 70% of the commercial beekeepers said they do not use them; 15% said they always use them; and 15% said they use written contracts only for new accounts involving growers they have never worked with in the past. A frequent beekeeper comment went along the lines of 'a handshake has always been enough for me and my growers.'

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, who have over the years maintained excellent cost accounting records, have responded with numbers that are very reasonable relative to today's economy. The average annual hive maintenance cost was \$96³⁵ per colony for the year 2002 (highest maintenance cost = \$180; lowest = \$52⁵⁰), which is obviously, a reduction from the \$104 reported for 1999.

It is very important to recognize that the average colony maintenance cost is higher than the average per colony pollination income and this is especially so from the 2002 survey information (colony pollination income = \$63⁷⁵; colony maintenance cost = \$96³⁵; a difference of \$32⁵⁰ per colony.) This illustrates that operation profits are generated by other sources of income outside of pollination rental, most importantly, honey production. As all beekeepers realize, the year 2002 resulted in the most dramatic increase in the wholesale price of honey in the history of American beekeeping. Depending on when you sold or contracted your honey in 2002, the wholesale price was from a low of \$0⁹⁰ to as much as \$1⁶⁰ per pound. Basing wholesale honey prices at a conservative \$1²⁵ cents per pound, the average commercial hive had to produce about 26 pounds of honey in order to break even.

Remember that much of the data presented here represent the pollination rental situation of the "average" commercial beekeeper. 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.

Reflections:

There are some recent observations that perhaps do not necessarily represent the "normal" conditions for commercial pollination rental by PNW beekeepers. One is the dramatic increase in the average size of a commercial beekeeping operation (4,255 colonies in 2002; 3,168 in 2001; and 2,055 in 2000.) In the past few years a number of very large sized operations have begun contributing to the survey, while the number of medium sized operations who report has dropped. This has unduly, perhaps artificially produced an "average" for a PNW commercial operation that does not really reflect the actual situation. Additionally, the average number of rentals per individual colony has decreased (1.75 in 2002; 1.92 in 2001; compared to 2.77 in 1999.) A small amount of this decrease could be explained by a shift of colonies away from pollination to honey production due to the incredibly dramatic increase in the wholesale price of honey in 2002, but that is far from the whole picture, especially considering that the sharp rise in honey prices began at least mid-way through the 2002 pollination season. For the production year of 2003 I would expect to see the higher honey price remove colonies from the pollination rental scenario.

A bright spot for PNW beekeepers is the steady and significant increase in the average price paid for almond pollination (\$45⁰⁰ in 2002; \$40⁷⁰ in 2001 and \$39⁰⁰ in 2000.) These almond averages represent the highest fees for any single crop pollinated by PNW beekeepers and reflect the concern and willingness of California almond growers to pay a premium rental fee in order to ensure adequate colony numbers.

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 eighteen years, has generated the most accurate assessment of commercial pollination known in the U.S.

Table 1. AVERAGE POLLINATION FEE 1992 - 2002

<u>1992</u>	<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>
19.25	22.50	28.10	29.60	31.55	31.05	29.65	32.25	32.85	33.65	36.40

Table 2. AVERAGE COLONY NUMBERS, AVERAGE RENTAL FEE PER HIVE & AVERAGE ANNUAL RENTAL INCOME PER HIVE FOR A COMMERCIAL BEEKEEPING OPERATION IN THE PACIFIC NORTHWEST 1992-2002.

<u>Year</u>	<u>Average Number Colonies</u>	<u>Average Rental Fee</u>	<u>Annual Rental Income per Colony</u>
1992	765	\$19.25	\$49.70
1993	990	\$22.50	\$62.25
1994	1,225	\$28.10	\$78.70
1995	1,348	\$29.60	\$78.15
1996	1,350	\$31.55	\$97.50
1997	1,504	\$31.05	\$92.20
1998	1,153	\$29.65	\$83.00
1999	2,058	\$32.25	\$89.30
2000	2,055	\$32.85	\$77.40
2001	3,168	\$33.65	\$64.60
2002	4,255	\$36.40	\$63.75

Table 3. 2002 AVERAGE COMMERCIAL POLLINATION FEES BY CROP

<u>Crop</u>	<u>No. Rentals</u>	<u>Avg. Fee</u>	<u>Income (\$)</u>
Pears	4,694	\$30.85	144,822
Cherries	5,566	\$30.05	176,156
Apples	46,657	\$32.30	1,506,986
Berries 1/	2,460	\$23.75	58,435
Blueberries	1,103	\$21.45	23,672
Cranberries	1,416	\$39.00	55,224
Vegetable seed	1,748	\$36.60	64,008
Clover seed 2/	420	\$32.00	13,440
Crimson clover seed	75	\$15.00	1,125
Radish seed	344	\$14.60	5,016
Cucumbers	400	\$23.00	9,200
Sq. & Pump. seed	532	\$32.60	17,354
Watermelon	1,132	\$34.80	39,420
Meadowfoam	42	\$35.00	1,470
Misc. 3/	337	\$27.05	9,112
Almonds	37,396	\$45.00	1,683,374
SUM =	104,322		\$3,799,814

Average Pollination Fee = **\$36.40**

1/ Includes blackberries, raspberries, Marionberries, & Loganberries.

2/ Includes red & white clover as grown for seed.

3/ Includes apricots, kiwi, vetch & holly.

SUMMARY INFORMATION - 2002

A total of **14** commercial beekeepers, owning **59,576** colonies returned survey forms.

A total of **104,322** colony rentals generated **\$3,799,814** in rental income.

The average per colony pollination rental fee (for all beekeepers, for all crops including California almonds) was: **\$36.40**

The average commercial colony was placed in **1.75** pollination sets in 2002, for an average per hive rental income of **\$63.75**.

The average commercial bee operation maintained **4,255** colonies and grossed **\$271,256** in pollination rental income for 2002.