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## Research from Oregon

### Pacific Northwest Honey Bee Pollination Survey – 2003

by  
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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 who generate income from pollination rental. More recently, the information has been professionally reviewed by agricultural economists from Montana State University and North Carolina State University. They view the establishment of pollination markets as a prime example of how economic interactions evolve in the real world of production agriculture.


2003 was a year of change for the Honey Bee Laboratory at Oregon State University. The honey bee professor entered the emeritus stage of his life and took official retirement from the university. Additionally, the administration at OSU made the decision to dissolve the entire entomology department. A honey bee program is still on-going at OSU but is now officially administered by the Department of Horticulture. The Honey Bee Laboratory is still functioning, but at a reduced profile. One of the activities that will continue for the foreseeable future is the conduct of the annual pollination economics survey.

A physical casualty in the closure of the entomology department was the loss of the PNW beekeepers mailing list. This has had consequences for the pollination survey conducted in 2003. A number of commercial beekeepers who had previously been sent survey forms did not receive them in 2003. This resulted in a reduced number of correspondents. A new mailing list is presently being generated and it is hoped that for 2004 a larger group of beekeepers will choose to participate. The strength of the survey relies on beekeeper willingness to take the time and effort to complete the survey forms. If you did not get a survey in 2003 and would like to participate in the 2004 program please contact the author at: Department of Horticulture, 4017 ALS Bld., OSU, Corvallis, OR 97331.

With each year's information, the strength and importance of our region's beekeeping industry is highlighted. All participants in a regional agricultural industry should 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

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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 2003 the average commercial beekeeper reported receiving 55% of his or her annual operating gross from pollination rentals, which is a reduced figure from previous years. This reduction in the dependence on pollination rental income has been strongly influenced by the dramatic increase in the wholesale price of honey for the past two years. One concern for that segment of the agricultural industry that requires managed pollination, is that the recent phenomenon of markedly 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 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.**

Ever since the arrival of the tracheal mites and Varroa 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 and those that remained needed to become larger and more efficient in order to fulfill the need for rental colonies by the at-large agricultural base in the PNW and in California.

As mentioned above, the "usual" beekeeper population that received the pollination survey was dramatically reduced in 2003, due to a major logistical problem. A total of 12 commercial beekeepers returned completed surveys in 2003. These individual beekeepers collectively owned 31,352 colonies. A total of 74,411 colony rentals were reported for all respondents, which produced \$2,712,738 in rental income for the 12 participating beekeepers.

For 2003 the average pollination rental fee, computed



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from commercial beekeeper rentals on all crops reported, was \$36<sup>45</sup>. This is a miniscule 0.<sup>05</sup> increase from the average pollination fee charged in 2002 (\$36<sup>40</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 2003 were so small 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



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generated from pollination rental leveled off in 1997 and 1998, but increased in 1999 (\$183,780). For 2003 this figure was calculated to be \$225,676. 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 \$28<sup>10</sup> (1994) to \$36<sup>45</sup> (2003). 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 fourteen years; 1990 = \$18<sup>40</sup> to 2003 = \$36<sup>45</sup>.

Within the PNW, tree fruits are the dominant crops for pollination income (see Table 2). In 2003 the combination of pears, sweet cherries and apples accounted for 40% of all reported rentals and 40% 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 47% of all

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rentals and 47% of all rental income in the 2003 survey. Almonds consistently have produced a high average pollination fee; for 2003 the average was \$46<sup>50</sup>. More than 95% of all commercial colonies in Oregon and Washington are taken to California for almond pollination. In 2003 the combination of almonds and tree fruit accounted for 87% of all rentals and 87% of pollination income, which illustrates the dominance and importance of these crops for a commercial PNW beekeeper.

In 2003, for crops pollinated in the PNW, cucumber pollination provided the highest average fee at \$52<sup>00</sup> per colony rental. The cucumber “average” should be taken with a slight grain of salt as only two corresponding beekeepers reported cucumber pollinations, and in one instance a pollination fee of \$65/colony was reported. In terms of acreage, apples are the largest crop grown in the region and this is reflected by the large number of reported rentals (28% of all rentals and 25% 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. This year the few beekeepers who reported crimson clover seed pollination charged no pollination fee to the growers. The significance of vetch and clovers grown for seed to the overall 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 2003 average pollination fee

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for all combined berry crops was \$23<sup>70</sup> which is nearly unchanged from the 2002 survey.

The average PNW commercial honey bee colony was rented 2.37 times in 2003 and this includes California almonds. This is an increase 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 2003 pollination season an average rental fee of \$36<sup>45</sup>, combined with an average of 2.37 pollination sets per colony, results in an annual per colony pollination income of \$86<sup>40</sup>, which is close to the 1999 colony income statistic of \$89<sup>70</sup>. And with the “average” commercial operation running 2,612 colonies, a hypothetical gross pollination income for the “average” commercial beekeeper was \$225,676 in 2003.

The combined colony numbers from those commercial beekeepers who responded to the 2003 survey, (31,352 hives), represent at least one-fifth to perhaps as many as one-fourth of the commercial hives in Oregon and Washington. Therefore, if we multiply the reported pollination income (\$2,712,738) by a factor of 5 and 4, we have a ball park estimate of the pollination income generated by commercial beekeeping in the PNW, *i.e.*, a regional pollination income perhaps as low as \$11,000,000 to a reasonable high of \$14,500,000. 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 in-

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come 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.

An added question to the survey was how frequent is the use of written pollination contracts between beekeepers and their respective growers. In the past three years the responses were very similar. It appears that using written contracts is not the usual situation. 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.

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 \$112<sup>10</sup> per colony for the year 2003 (highest reported per colony maintenance cost = \$175; lowest = \$75).

It is very important to recognize that the average colony maintenance cost is higher than the average per colony pollination income. From the 2003 survey information pollination income was \$86<sup>40</sup>/colony and the colony maintenance cost was \$112<sup>10</sup>; a difference of \$35<sup>70</sup> 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 years 2003 largely maintained the dramatic increases in the wholesale price of honey that occurred in 2002. Depending on when you sold or contracted your honey in 2003, the wholesale price was from a low of \$1<sup>00</sup> to as much as \$1<sup>50</sup> per pound. Basing wholesale honey prices at a conservative \$1<sup>25</sup> cents per pound, the average commercial hive had to produce about 28.5 pounds of honey in order to break even.

Remember that much of the data presented here represent the pollination rental situation of a hypothetical "average" commer-

cial 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.

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.

*(Summary information continued on page 13)*

### Summary Information - 2003

- Total number of participating commercial beekeepers = **12**
- Total colony rentals = **74,411**
- The average per colony pollination rental fee (for all beekeepers, for all crops including California almonds) was: **\$36<sup>45</sup>**.
- The average commercial colony was placed in **2.37** pollination sets in 2003, for an average per hive rental income of **\$86<sup>40</sup>**.
- The average commercial bee operation maintained **2,612** colonies and grossed **\$ 225,676** in pollination rental income for 2003.

## Your Editor

Here I am on a beautiful Spring evening, contemplating the lives of Washington State beekeepers.

The past three weeks I've been into some wonderful smelling hives. Hives chock full of capped brood, just bursting to get out. Of course the weaker hive is getting equalized and hopefully will be able to perform with the advent of good weather.

Coming back from the meeting in Ellensburg, I thought what a great bunch of folks attended the meeting. I was impressed with the resurgence of energy and sense of purpose and beekeepers willing to volunteer precious time to further excellent beekeeping practices. I was also thankful that some of the presidents from local associations took the time to attend.

The Fall program in Spokane has an excellent group of researchers and the IEBA is doing a great job getting the event organized.

This years' June Picnic at WSU will out do last year. Steve Sheppard's crew is putting together a program which I'm sure will exceed your expectations. I'll send out more details in a flyer as we get the events tied down.

Paul Lundy

**Table 1. Average Pollination Fee 1992-2003**

<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>	<u>2003</u>
19.25	22.50	28.10	29.60	31.55	31.05	29.65	32.25	32.85	33.65	36.40	36.45

**Table 2. 2003 Average Commercial Pollination Fees by Crop (responding commercial beekeepers)**

<u>Crop</u>	<u>No. Rentals</u>	<u>Avg. Fee</u>	<u>Income(\$)</u>
Pears	5,648	\$30 <sup>15</sup>	\$170,377
Cherries	8,652	28 <sup>60</sup>	247,601
Apples	20,792	32 <sup>35</sup>	672,744
Berries <sup>1</sup>	788	21 <sup>40-</sup>	16,856
Blueberries	1,802	24 <sup>70</sup>	44,502
Cranberries	1,000	40 <sup>00</sup>	40,000
Vegetable seed	3,878	41 <sup>10</sup>	159,298
Clover seed <sup>2</sup>	292	20 <sup>25</sup>	5,920
Crimson clover seed	856	-0-	-0-
Radish seed	510	26 <sup>20</sup>	13,350
Cucumbers	300	52 <sup>00</sup>	15,600
Sq. & Pump. Seed	384	38 <sup>75</sup>	14,880
Watermelon	960	35 <sup>00</sup>	33,600
Misc. <sup>3</sup>	132	26 <sup>70</sup>	3,524
Almonds	27,412	46 <sup>50</sup>	1,274,486

SUM = **74,411** **\$2,712,738**  
 Average Pollination Fee = **\$36<sup>45</sup>**

<sup>1</sup>Includes blackberries, raspberries, Marion berries, & Logan berries.

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

<sup>3</sup>Includes kiwi & flower seed.

**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 1992-2003.**

<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>
<b>2003</b>	<b>2,612</b>	<b>\$36<sup>45</sup></b>	<b>\$86<sup>40</sup></b>