

# PACIFIC NORTHWEST (PNW) 2011 BEEKEEPER POLLINATION SURVEY



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Beginning in 1986 Dr. Mike Burgett of the Honey Bee Lab at Oregon State University began an annual survey of pollination economics in the Pacific Northwest states (OR, WA and ID). The 25<sup>th</sup> Annual report (2010) was published in Jan, 14 2011 Honey Market News and the BEE-LINE, newsletter of the Oregon State Beekeepers Association (ORSBA.org). The 2010 survey year revealed a 21% drop in average weighted pollination fee, the greatest decrease in the 25 year record. The current authors, with concurrence of Dr. Burgett, have continued and expanded the annual survey into the 26<sup>th</sup> year. By expanding our survey base, we report that weighted income level of all rentals for 2011 has once again increased over previous years.

We sent electronic and snail mail requests to approximately 150 commercial (500 plus colonies) and semi-commercial (50 to 500 colonies) OR & WA beekeepers. A similar survey was sent by Michael Cooper to 144 Idaho beekeepers. We were able to utilize 63 returns from commercial beekeepers (13 commercial OR beekeepers, 9 commercial WA beekeepers and 28 ID Commercials) who all together managed 155,424 colonies (simple avg 3108 colonies - 2617 avg for OR, WA = 5582 avg & ID = 2704 avg). An

additional 5 OR, 6 WA and 2 ID semi-commercial beekeepers =13 semi-commercial beekeepers (228 simple avg colonies – OR = 300.6 avg, WA = 193 avg & ID = 300 avg). If we consider 2010 NASS statistics that there were 59,000 OR honey producing colonies (estimated from beekeepers own-

ing 5 or more colonies), 71,000 in WA, and 98,000 in ID, our survey represents 69.5% of those beekeepers (73% WA, 60% OR and 74% of ID beekeepers).

The 2011 pollination survey continues to illustrate the importance of pollination rental for PNW beekeepers. Overall these 63 bee-



**Figure 1. Average colony rental fee 1986-2011, PNW beekeepers (number of respondents variable each year; in 2011 there were 63 commercial/semi-commercial beekeeper respondents.**



**Bees in blueberries**



**Bees in meadowfoam**

keepers report 234 crop rental opportunities of 16 crops for a total of 254,000 colony rentals (1.6 simple avg rentals per colony owned). However, the average rental listed per commercial PNW beekeeper was 4.2 (range of 1 to 15 rentals). There was a big disparity between ID beekeepers which averaged 2.1 rentals, while OR beekeepers av-

eraged 5.8 rentals and WA beekeepers averaged 6.2 rentals. The 13-semi-commercial beekeepers in this study averaged 3.5 rentals (range 1 to 12 rentals).

Table 1 summarizes the number of individuals reporting rentals for the crop indicated, the total number of colonies rented for the crop, the total value of the rental (# colonies

X fee reported by each individual for the crop indicated), weighted fee (total rental value divided by number of rental colonies) and range in service fee reported by respondents. Sum of total value of pollination fee reported by respondents was just under \$23 million. The 2011 weighted average fee of rental colonies was \$90.62, an increase of 0.72 cents over the 2009 weighted average and \$20.23 over the drastic drop last year (Figure 1).

By far the largest rental fee generator for OR, WA and ID beekeepers is California almond rental, which has been the case for the last several survey years. Almond rentals were reported by all but 3 OR and 4 WA semi-commercial beekeepers (= 56 total individuals rented to almonds). Respondents reported renting from 40 to 9571 colonies to almonds, for a total of 118,850 colonies. Rental fee ranged from \$121 to \$172 – weighted average= \$139.20 for total rental income of \$16,542,802.

The steep 21% decrease in weighted average pollination fee (\$89.90 in 2009 but only \$70.85 reported last year by Mike Burgett) was attributed largely to a lower price for almond rentals of the 18 respondents to the 2010 survey as borne out by plotting of annual average weighted fee of almond and other crops (Figure 2. ) Still this one crop accounted for 27% of all rentals and 52% of rental income in 2010. The average weighted almond rental fee reported by the 63 beekeepers in 2011(\$139.20) was \$2.00 above the previous year (and 2007), but less than the average almond fee for 2008 (\$148.15) and 2009 (\$150.30) surveys. This argues for a leveling of the rental price in California almonds. In 2011, almond rentals accounted for nearly half (47%) of approximately 254,000 total rentals and 72% of total rental fee income of PNW beekeepers.

With our expansion of sample size in the 2011 survey, we believe we present a more realistic snapshot of the pollination industry by PNW beekeepers. Within the PNW region, tree fruits remain the top pollination opportunity. In 2010 Almonds and tree fruits combined accounted for 67% of all rentals and 79% of pollination income. In 2011, almonds plus tree fruits were 79% of all rentals and 89% of income. Berry rental (blackberries, raspberries, marionberries, blueberry and cranberry) represented a distant third in importance with 8.3% of rental colonies (but of this one crop, blueberry, represented 65% of berry rentals and nearly 72% of the total berry rental fee income). Seed production (vegetable and clover seed – see below) was slightly less at 6%. Rental to Canola and meadowfoam (oil seed crops) and 3 cucurbits were the other major crop groups bringing in rental income.

It is clear that the tree fruit rental income is not consistent with the demand for colonies. Although tree fruit colony numbers were recorded at 1/3<sup>rd</sup> of total colony rentals, income was only 1/2 that level (17%). Pear pollination (23 individuals reported rental of 28,600 + colonies), apples (13 individuals provided almost 26,000 colonies) sweet cherries (23 beekeepers rented almost

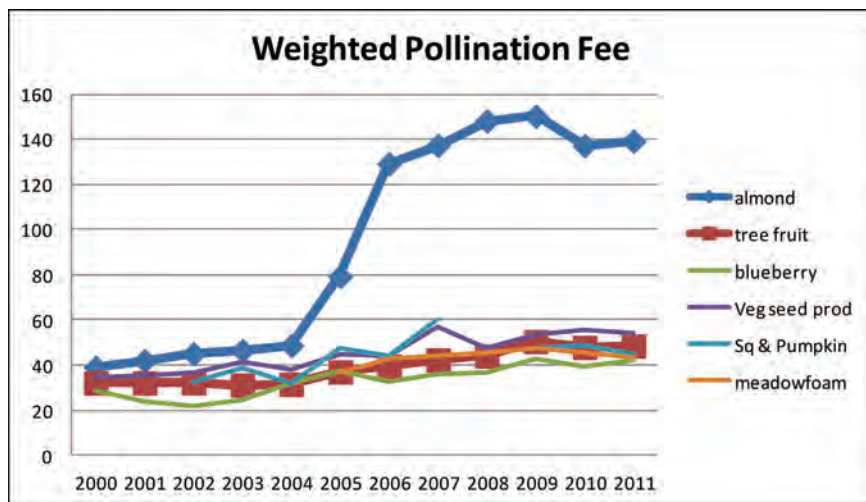


Figure 2. Weighted Colony rental fee for almond (top bold), tree fruits (Lower bold - includes pears, sweet cherries and apples combined), blueberry, vegetable seed crops (principally carrot, radish & onion), squash & pumpkin and Meadowfoam crops, 12 years 2000-2011.

Crop	No Indiv	No Col	total value	Avg fee	fee range
apples	13	25,856	\$1,147,273	\$44.35	\$28-\$60
berries	21	7,228	\$218,865	\$30.30	\$16-55
blueberry	18	14,279	\$605,054	\$42.35	\$28-55
cranberry	3	372	\$20,000	\$53.75	\$40-60
cherries	23	19,869	\$927,971	\$46.70	\$28-60
pears	23	28,617	\$1,534,592	\$53.65	\$28-60
mixed fruit <sup>1</sup>	7	6404	\$309,440	\$48.30	\$38-55
cucumber	4	684	\$45,960	\$67.20	\$35-75
Sq/pumpkins	11	1215	\$54,258	\$44.65	\$20-75
watermelon	2	1548	\$77,400	\$50.00	
canola	1	5000	\$295,000	\$59.00	
meadowfoam	9	2684	\$115,788	\$43.15	\$40-48
clover seed	14	4936	\$166,899	\$33.45	\$10-45
veg seed	33	16,357	\$884,511	\$54.00	\$32-75
almond	56	118,850	\$16,542,802	\$139.20	\$121-172
<b>total</b>	<b>234</b>	<b>253,899</b>	<b>\$22,945,813</b>	<b>\$90.62</b>	

<sup>1</sup> Includes mixture of pears, apples, cherries plums, peaches + surveys where 2 or more fruit were identified – also includes a range of prices \$38-45 in one instance so mid-price \$41.50 used.

Table 1. Number of beekeepers who rented colonies for each of 16 commodities, total colony rentals reported for each crop, colonies/acre rented by crop (range), pollinating fee (weighted average), and fee range for each rental. 2011 PNW (OR/WA/ID) Beekeeper Survey.



Crop	# col rentals	% rentals	rental income	% rental income
Tree fruit	80,746	32%	\$3,919,276	17%
Almonds	118,850	47%	\$16,542,802	72%
Seed prod	16,357	6%	\$884,511	3.9%
Cucurbits	3447	1.4%	\$177,618	0.8%
Berries	21,879	8.3%	\$843,919	3.7%
Oil crop <sup>1</sup>	7684	3%	\$410,788	1.8%
<b>Total</b>	<b>253,899</b>		<b>\$22,945,813</b>	

<sup>1</sup> Canola & meadowfoam

**Table 2. Pollination rentals and income by crop type as reported by 63 PNW beekeepers, 2011.**

20,000 colonies) were, in that order, the best fee generators among tree fruit rentals. As with other crop rentals assessed in this survey, the range in rental price was over 2X (\$28 to \$60 for pear and sweet cherry and \$33 to \$60/colony for apple). Only Almond (\$121-\$172) and Meadowfoam (\$40 to \$48) exhibited narrow price ranges (Table 1.)

For a variety of Vegetable seed crops, 33 PNW beekeepers reported rentals (range of 20 to 5000 col) for total of 16,357 colony rentals. Pollination fees were reported over a large range of \$35 to \$75. Weighted average rental fee was \$54.00 with total value of \$884,551. Clover (red, white primarily and some vetch seed production) was reported by 14 individuals as garnering a rental income; there were 5 additional surveys submitted where \$0 income was reported – these last 5 were not included in colony number or income fee statistics. The 14 individuals rented just under 5000 colonies at range of 8 to 1192 colonies rented for which income from \$10 to \$45/colony was listed – the widest price range of any of the crops in the PNW, perhaps reflecting the presumed importance of clovers for honey production. Weighted average for clover seed was \$33.47 for a total value of \$166,899. Clover seed and black-, rasp- & marionberry rentals

were the only 2 of the 14 crops with a weighted average rental price below \$40.

Thirteen OR commercial and 9 WA commercial beekeepers estimated their approximate income source as 28% honey sales, 68% pollination and 4% other. ID beekeepers listed honey production as averaging 29% and pollination as 69% (rest other). For the 13 semi-commercial beekeeper respondents, it was more nearly a 50-50 split, slightly in favor of honey sales (52%) to pollination rental (47.5%).

Our survey asked if a pollination contract was used. Equal numbers of commercial beekeepers indicated YES and NO (16 each); 13 said sometimes. For semi-commercial beekeepers, 4 said yes, 7 said that they did not and 2 indicated they used one sometimes. Respondents also were asked for number of employees. Responses included 1 to 12 employees with 60% saying 0 or 1; 1 was the most common number.

When asked to estimate cost of maintaining a colony, responses varied widely (60% response rate). Annual colony costs of OR commercials (n=13) averaged \$200 (range \$130 to 250), 9 WA commercials averaged \$202 (range \$120 TO \$375) and 22 ID beekeepers averaged \$144.50, with overall range of estimates varying from \$50 to

\$230. For Semi-commercials (n=9), the average was \$91 + 2 that listed fuel only cost.

## Discussion

The use of managed honey bee colonies for commercial crop pollination continues to be a major management decision requiring large numbers of pollination rental colonies. The 63 PNW survey respondents in 2011, the 26<sup>th</sup> pollination economics survey year, reported a weighted average pollination fee of \$90.62, an increase over the 2009 survey average (\$89.90) and a much lower weighted average last year (\$70.85) and in fact is the highest average in the 26 yearly surveys. The steep decrease found last year appears to be due both to a smaller number of returns and a decrease in almond rental prices. Although the average almond rental fee is not as high as in two previous survey years (2008 and 2009), an increase average was noted of \$2.00/colony.

This survey demonstrates, in the words of Dr. Burgett in his 25<sup>th</sup> annual report, that "The vast and diverse agriculture of the PNW relies on a healthy and strong beekeeping industry to maintain optimum production. An enlightened knowledge of pollination economics is crucial to every beekeeper who enters the world of commercial crop production." We couldn't agree more. Although the survey populations have varied over the 26 years of the survey, we believe the representation in our 2011 survey of over 72% of the estimated colony numbers maintained in the PNW region points to the rigor of the survey and validity of our sampling method.

In the PNW region, the USDA NASS estimates (for 2010 the last full year available) estimates 228,000 colonies. In our survey, of 69.5% of this number of colonies, respondent beekeepers reported that pollination income represented approximately 70% of income. For the 63 respondents this was just under \$22 million. The NASS combined 3-state value of honey was estimated as \$11,690,000 (in 2010), a 20% increase from the year before. If we extrapolate that the pollination income of \$22 million is 70% of total income as respondents indicated, then



(l) Bees in pears in the Hood (Hood River Valley) (r) Pear bloom, Mt. Hood in background



**Red clover pollination in OR.**

the total estimated pollination value of the region exceeds \$30 million dollars. NASS statistics indicate \$12 million as the approximate honey production value then the 70% of respondents would “own” \$8.4 of this amount. The numbers from the NASS and this survey come up amazingly similar. The ratio of \$8.4 honey income representing 28% and \$22 million representing 70% pollination income is actually 27% and 71%.

Thus, this survey continues to demonstrate the dominance of pollination rental income to a PNW beekeeper’s financial health. Comparing the hypothetical PNW rental income value (\$30 million) with the farm gate value of crops needing supplemental pollination in PNW (\$2.75 billion) demonstrates that pollination “costs” are barely 1% of total crop value. This varies with individual crop market value (and almond is not included in the PNW figure.)

Over the past dozen years (since 2000), the average pollination fee has increased from \$32.85 to \$90.62 an increase of 175%. While dramatic, it should be stressed that payment of pollination fees, although an indispensable service, represents a minor operating cost to growers of crops benefitting from supplemental pollination and has consistently lagged behind the real value of the service. It is only the last ½ dozen years as illustrated in figure 1 that the fee for services has vastly improved, largely due to one particular crop, almond rentals, as Figure 2 clearly illustrates.

The major neighborhood crop, tree fruit pollination, continues to lag behind in income opportunity. Rentals represented 32% of the total regional pollinations, but income was only ½ that at 17%. Likewise a rental fee of \$28, although only reported for less than 1% of the total rentals, would seem hard to justify with moving expenses and time involved. The wide disparity in the range of rental prices in tree fruit and a half-dozen other crops (almonds and meadowfoam were the exceptions) also seems to indicate that not just pollination colony renters, but also beekeepers do not have a good sense of the need for pollination services. Nearly as many beekeepers operate on a “handshake” or telephone call system as with a pollination contract. Is the undervalue of tree fruit

pollination the result of both parties not fully recognizing the real values here?

The neighborhood crops of PNW beekeepers benefit greatly from the early season almond rentals that provide the vast majority of income (72%), although preparations to produce exceptionally strong, early season colonies and transport costs are measurably higher. Downstream benefits include stronger colonies for subsequent rentals, opportunities for division of colonies that exit almond rental fields in greater strength and colonies with large brood populations (sometimes sold for extra income).

Following fruit and berry rental opportunities, the next major rental, seed production, mostly in the drier climates east of the cascade range and fertile crescent of southern Idaho, likewise is not as lucrative for the beekeeper as the need for pollination service requires. For vegetable seeds, stocking rates are very high (often above 3 colonies/ac) as production needs dictate rowing of male fertile and male sterile rows which honey bee foragers quickly become accustomed to and therefore less efficient at pollen transfer. Clover seed rental, once largely vetch but now primarily red clover, is viewed by some as a honey crop (but many dispute its value, particularly for the Willamette Valley of Oregon) and still gets “free” pollination as 1 in 3 beekeepers reported \$0 income from this colony placement.

The average number of pollination rentals was higher for commercial compared to semi-commercial beekeepers as one might expect. It was also higher for OR/WA beekeepers than ID beekeepers. This latter factor probably reflects the availability of opportunities in the different regions. A greater percentage of beekeepers from ID rented solely to almonds (43%) than did OR/WA individuals (5%) and reported a slightly higher percentage of income from honey production (29% vs 27.5% for OR/WA beekeepers). Interestingly, larger rental opportunities for OR and WA beekeepers compared to ID individuals (2 X as many average rentals) is not matched by higher honey production income for ID beekeepers. USDA statistics point to lower honey production for ID (4 million pounds with 98,000 colonies=40.8 lbs/col) compared to OR/WA (7.7 million pounds from 130,000 colonies=59 lbs/col.)

Beekeeper estimates varied widely on the annual cost to maintain a colony (from \$50 to over 4 times that amount) and a considerable percentage did not provide a response. Lack of response to the cost per colony could be due to individuals not computing costs in that manner or simply not yet having computed annual operating expenses at time of completing survey, as stated on at least 2 survey forms. Responses did roughly track with the number of employees as higher colony operating costs were generally listed by those respondents with the higher number of employees (lack of a response was not interpreted as 0 employees). OR/WA beekeepers had a higher operating cost (perhaps reflecting the fact they had double the number of rentals) compared to ID beekeepers.

It must be emphasized that the information here is not from the same individuals each year and is not directly comparable from one year to the next. Information is only as accurate as provided by individual respondents. We believe with the large number of responses and the large representation of the commercial beekeepers of the region, that this data is robust and representative of the true situation. The individuals who contribute, in fact any individual renting bee colonies, should use the information to compare to their own individual operation.

We wish to thank the beekeepers of Oregon, Washington and Idaho who took the time to participate in the survey. The 26-year record represents the most extensive and accurate assessment of commercial pollination in the US and points to evolution of our bee industry over this quarter century time frame. We trust you find it of interest and the information of value. We welcome your feedback.

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