

HELICOPTER POLLINATION STUDY 1994
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Objective: Investigate the effect of wind generated by a helicopter on cranberry plant pollination and fruit set.

Method: During the 1994 growing season plots were established at the Norris & Son Cranberry marsh to determine what effect wind produced by the rotor of a helicopter has on cranberry plant pollination and fruit set. At the onset of bloom and in the absence of grower supplemented pollinators (honey bees/bumblebees), 4' x 4' plots consisting of four separate treatments were established (see "Treatments" table below). Throughout bloom treatments one and two were constantly open to all natural pollinators while treatments three and four were caged to exclude pollinators (pre and post flights). However, during actual flying time only treatments one and three remained open while treatments two and four were closed (binned) to both pollinators and wind. This design allowed for four different combinations of exposure to pollinators and wind. Each treatment was replicated five times on a single bed of the Seales variety (Figure 1).

Treatments

- 1 = O/O: open to pollinators, open to helicopter wind.
- 2 = O/B: open to pollinators, closed to helicopter wind.
- 3 = C/O: closed to pollinators, open to helicopter wind.
- 4 = C/B: closed to pollinators, closed to helicopter wind.

Five separate flights were made during bloom (see "Flights" table below). The helicopter, a piston-powered Bell 47, travelled at approximately 5 miles per hour and hovered approximately 3-5 feet over the top of the vines. Three to four passes were made per bed depending on their width. Total flying time was about one hour for each date flown. Cost per hour of flying time = \$250.

Flights

Flight No.	Plant Growth Stage	Date
1	@ 20% in bloom	20 June
2	@ 65% in bloom	24 June
3	@ 40% out-of-bloom	27 June
4	@ 50% out-of-bloom	30 June
5	@ 80% out-of-bloom	6 July

At the end of the growing season one square foot samples were harvested from each plot to determine final production values.

RESULTS/DISCUSSION: (Figures 2 & 3). First of all, there was a statistically significant difference in the mean number of berries, total berry weight and mean berry weight per square foot where plots were open to pollinators (treatments 1 & 2) vs. those closed to pollinators (treatments 3 & 4). This data alone shows the importance of pollinators whether they are native or indigenous to the area, or whether they are grower supplemented.

FIGURE 4

Helicopter Pollination Study

Mean Barrels / Acre

<u>Treatment</u>	<u>Barrels</u>
1 (O/O)	152
2 (O/B)	127
3 (C/O)	29.5
4 (C/B)	15.6

Table 4. Effect of time of bee exclusion cage placement on the yield and fruit size on Stevens and McFarlin cranberry bogs in Long Beach, WA.

Exclusion Period ^a (% out of bloom)	Yield (bbt/A)				% Small Fruit (<3/8")				% Large Fruit			
	Stevens		McFarlin		Stevens		McFarlin		Stevens (>5/8")		McFarlin (>1/2")	
	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
None	173	452	74	256	6	8	13	2	10	30	31	41
0-25%	156	342	87	229	15	8	16	2	5	23	28	28
25-50%	138	458	90	241	12	7	12	4	5	24	38	38
50-75%	133	359	59	238	11	10	9	1	7	28	35	38
75-100%	165	400	88	233	10	2	10	2	15	36	41	49
0-50	152	403	54	209	18	5	18	2	3	27	16	33
50-100	137	395	76	191	12	13	10	2	9	28	37	45
0-25 + 75-100	148	396	51	197	13	3	14	2	9	37	20	41
25-75	144	311	46	191	17	14	17	3	6	17	25	40
0-100	--	130	--	44	--	60	--	11	--	0	--	16
LSD	25	95	30	62	6	7	8	4	6	14	16	11

^aIn 1993, dates for 0-25%, 25-50%, 50-75% and 75-100% exclusion were May 24 to June 2, June 2 to June 14, June 14 to June 21, June 21 to June 25 for Stevens, respectively, and June 3 to June 17, June 17 to June 25, June 25 to July 2, and July 2 to July 14 for McFarlin, respectively. In 1994, dates for 0-25%, 25-50%, 50-75%, 75-100% exclusion were May 17 to May 26, May 26 to June 5, June 5 to June 19, June 19 to June 28, for Stevens, respectively, and May 26 to June 11, June 11 to June 21, June 21 to June 27, June 27 to July 4, respectively.