

## FINAL PROJECT REPORT

**Project Title:** Synthetic honey bee brood pheromone to enhance pear pollination

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**Cooperators:** Pear growers and beekeepers in Oregon  
Contech Inc., B.C, Canada

**Other funding sources:** None

**Total Project Funding:** \$4000

### Budget History:

Item	2010	2011	Year 3:
Salaries	3300		
Benefits			
Wages			
Benefits			
Equipment			
Supplies	225		
Travel	475		
Plot Fees			
Miscellaneous			
Total	4000	Did not apply for 2 <sup>nd</sup> year funding	

## **OBJECTIVES**

Primary goal of the project was to enhance pollination efficiency of honey bee colonies rented by pear growers for pollination, by using synthetic honey bee brood pheromone that has the potential to increase foraging stimulus of honey bees.

*Specific objective:* Examine and compare synthetic brood pheromone-induced foraging activity of treated colonies with controls in pear orchards.

## **SIGNIFICANT FINDINGS**

Honey bee colonies treated with synthetic brood pheromone (SuperBoost®) had significantly greater number of foragers when compared to control colonies. The ratio of pollen to non-pollen foragers entering colonies was significantly greater in pheromone-treated colonies after brood pheromone treatment.

## **RESULTS & DISCUSSION**

The ratio of pollen to non-pollen foragers entering colonies was significantly greater in pheromone-treated colonies after brood pheromone treatment. Foragers in pheromone-treated colonies returned with pollen load weights that were significantly heavier than controls. Pollen returned by foragers from pheromone-treated colonies was 47 % more likely to originate from the target crop (pear).

The mean sum of foragers entering colonies in a 5-min period was also significantly different between treatments (ANOVA:  $F_{1,10} = 8.1$ ;  $P < 0.01$ ). A significantly greater proportion of pollen foragers were observed returning in pheromone treated compared with control colonies (chi-square = 7.9,  $df = 1$ ,  $P < 0.01$ ). The mean ratio and standard error of pollen to non-pollen foragers was  $0.3 \pm 0.1$  in pheromone-treated colonies and  $0.06 \pm 0.002$  in controls. That is, in pheromone-treated colonies there were about 3 times the numbers of non-pollen to pollen foragers, whereas in control colonies there were about 16 times the numbers of non-pollen foragers. Pollen load weight was significantly greater in the pheromone-treated colonies (ANOVA:  $F_{1,10} = 24$ ;  $P < 0.01$ ). Pollen loads returned by bees from pheromone treated colonies were 47 % more likely to originate from the target crop (pear) (chi-square = 62,  $df = 1$ ,  $P < 0.0001$ ).

Results from this study suggest that synthetic brood pheromone increases total number of foragers and pollen foraging activity in honey bee colonies treated with brood pheromone in pear orchards. This increase in foraging may be a result of enhanced stimulation of foraging behavior by the

synthetic brood pheromone. This increase in foraging and especially pollen foraging is potentially beneficial for pear pollination keeping in view the fact that many times it is challenging to have adequate honey bee foraging activity during pear bloom.

## **EXECUTIVE SUMMARY**

Adequate pollination is the key for high fruit quality and yield. One of the challenges facing pear growers is ensuring adequate pollination. Honey bees are principal pollinators of pear. Honey bees may be easily lured to flowering plants that are more attractive and rich in resources (Delaplane and Mayer 2000). Hence there is a need to explore tools or strategies that enhance pollination efficiency of honey bee colonies and increase overall pollination in pear. Brood pheromone (BP) released by honey bee larvae is an excellent apicultural tool that has the potential to increase pollination by manipulating foraging stimulus of honey bee colonies. In this study we examined if synthetic BP can be used to enhance pollination in pear.

Results from this study indicate that honey bee colonies treated with synthetic brood pheromone (SuperBoost®) in pear orchards had significantly greater number of foragers when compared to control colonies. The ratio of pollen to non-pollen foragers entering colonies was significantly greater in pheromone treated colonies after brood pheromone treatment. Future research should focus on documenting increase in crop yield and fruit quality resulting from increased pollination, as a result of synthetic honey bee brood pheromone use.