Increasing pollination efficiency of hybrid carrot seed.

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ISSUE: Jefferson County Oregon is the world's largest producer of hybrid carrot seed, meeting 80% of the domestic demand, and 65% of the global demand for this important high-value crop. In order to set seed, carrot flowers require an insect pollinator. Carrot seed producers rent hives of European honey bees. But the hybrid carrot flower produces less nectar than open pollinated carrot, and its pollen is of lower protein content. Thus, honey bees are more likely to seek richer sources of pollen and nectar, even from non-crop plants. Worker bees forage to meet the caloric and protein needs of hive residents – adults and larvae. Adult and larval bees release specific odors; the intensity of the odor increases with the size of the population, and indicates to worker bees what the hive population is and need for food resources.

WHAT WAS DONE: In small-scale carrot seed crop field trials, honey bee hives were outfitted with a bee brood pheromone source, which in effect, signaled to the foragers that the larval population of the hive had increased dramatically. Within 6-7 hours, the foraging behavior of the hive increased to meet the apparently increased needs of the hive. As a result, hybrid carrot flowers were more intensely pollinated.

IMPACT: These data are preliminary and not yet published, but the experimental fields produced 15% more carrot seed than fields without the pheromone-added hives. Thus, the treated fields grossed an additional $600 per acre.

Central Oregon Seed considers this work so important that they provide annual funding to support best management practices for beekeeping. Current efforts specifically address honey bee nutrition studies.