Nest Lures for Wild Blue Orchard Bees in Commercial Orchards

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Interpretive Summary:

In order to better understand nesting preferences of blue orchard bees, we determined if they are attracted to use nest cavities of bees of their own species rather than to used cavities of a bee species from the same bee family or new, unused cavities. The bees were offered nesting cavities containing one old nest cell of their own, one old nest cell of another bee species, or cavities containing no nest cell. We found that the blue orchard bees prefer nest cavities containing old cells of their own species, presumably because these cells provide an easily recognized odor cue used by bees searching for suitable nest sites. They seem also to choose cavities with no nest cells over cavities containing cells of another bee species. The results of this research indicate that it may be possible to development a type of nesting lure to help attract and retain blue orchard bees at commercial nesting sites for commercial pollination of orchard crops.

Objectives:

To better understand nesting preferences of the blue orchard bee, *Osmia lignaria* (Family Megachilidae), by determining if blue orchard bees are attracted to used, conspecific nest cavities rather than to new, unused cavities or used cavities of a bee species from the same bee family, such as the alfalfa leafcutting bee, *Megachile rotundata*.

Materials and Methods:

Six nest shelters were placed at regular intervals in an orchard known to be frequented by wild blue orchard bees. Each shelter had three wood nesting blocks, each with 25 nest cavities drilled in them and containing a different type of paper drinking straw as a cavity insert. The cavities in one block contained clean, new straws. In the second block, each cavity contained a single blue orchard bee cell in the back of each straw. Each straw in cavities of the third block contained a single cell of the alfalfa leafcutting bee.

In each shelter, the blocks were placed in a different order. Shelters were checked daily for bees nesting in the blocks. The location of capped nests was recorded daily, and then each capped nest was removed and replaced with another straw of the same type. Night or early morning counts of bees resting in cavities were conducted every third day to help approximate the number of bees nesting in each block, or simply bees present in the orchard. At the end of orchard bloom and apparent nesting, data were evaluated for the number of nests made in each block.

Results and Discussion:

Between 15 April 2007 and 18 May 2007, the number of resting females counted ranged from 19 to 172. A total of 285 capped nests were recorded. The number of capped nests plus the number of partial nests (containing at least one cell) equaled 400. More nests were initiated and capped in blocks containing old blue orchard bee cells than in blocks containing old cells from alfalfa leafcutting bees or blocks containing no cells (Table 1). Also, bees began capping nests in blocks containing old blue orchard bee cells ten days sooner than they capped nests in either of the other available block types.

Table 1. Number of nests made by blue orchard bees in blocks with straw nest inserts containing old blue orchard bee cells, old alfalfa leafcutting bee cells, and no cells.

	Blue Orchard Bee Cell	Alfalfa Leafcutting Bee Cell	No Cell
Number of Capped Nests	130	67	88
Number of Partial Nests	35	38	42
Total Number of Nests	165	105	130

It is apparent that blue orchard bees preferred straws containing old conspecific cells, presumably because these cells are an easily recognized odor cue used by the bees searching for suitable nest sites. They seem also to choose new straws over staws containing cells of another bee species. These data are being analyzed statistically to further evaluate the timing and frequencies of nest cavity selection.

This experiment has supplied useful information that can be used as a basis for ongoing and future research. We have shown that nesting blue orchard bees respond to the odor cue of old conspecific nests; the next steps include determining which component of the old nests is the most attractive and determining if these bees can be taught to respond to a novel odor cue. This line of research may eventually lead to the development of odor cues as a method of attracting nesting blue orchard bees, thus increasing bee retention and reproduction in agricultural settings.

Recent Publications:

None to date.