NESTING HABITS OF A SOLITARY BEE OF THE GENUS *SPINOLIELLA* OF ASHMEAD[1]

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The nests of the bees of this genus are generally hard to find. The insects are so small, usually not more than a quarter inch long, that they are difficult to follow in their flight. In fact, so far as I can tell, no information is available on their nesting habits.

It was on a fine sunny day in the latter part of August, 1927, while visiting the Country Club at Denver, Colorado, that my attention was called to some small mounds of dark soil resembling ant nests. These were located along the side of a tennis court. It was soon evident that they were the nests of some bees. They had picked three different areas in which to establish their dwellings. Each colony possessed some forty or fifty nests separated from one another by a distance of about six inches.

Each day the courts had been moistened and rolled by the caretaker. And each day the busy owners had thrown up the small mounds of soil over their entrances. When I arrived, the colonies were bustling with work. Here was a bee opening the entrance to her nest. Up the tunnel she backed, pushing a load of earth. When almost to the top, she suddenly stopped and descended for another load. The earth in the entrance-way remained without falling. Presently she was up again with some more. This was also pushed out of the entrance a portion remaining in the passage-way as before. The little mound of soil above the nest was steadily increasing in size. Over here was a female just in from the fields. Her hind legs were heavy and quite conspicuous with their loads of green pollen. Back and forth she circled, undecided which of the nests was her own. Several times she alighted on the ground. After a minute, the problem solved, she hovered over her nest and entered. In other

[1]*Spinoliella australior* Ckll. Determined by Miss Grace Sandhouse.

places, other females were coming in from the fields. Some had loads of green pollen; others had yellowish-green. Could they be visiting different species of flowers?[2] All the while, in a constant whir of motion, the males of the colony were circling above the nests. Occasionally one alighted for a moment or two but was soon on his way. The male was not to be worried with the intricate problems of nesting. His was a life of pleasure.

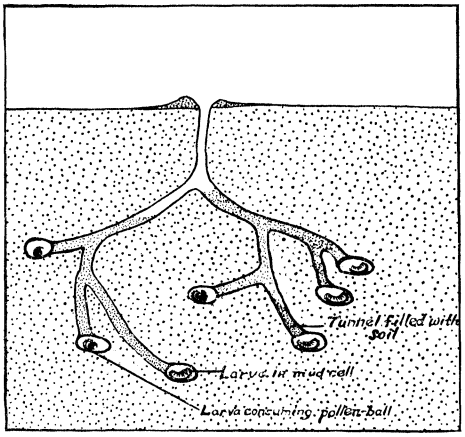

Fig. 1. Plan of nest of *Spinoliella australior*. The nests, which extend down to a depth o f three or four inches, contain about seven larvæ. This is a vertical section of the earth showing all the ramifications of the nest. Coarse stippling indicates cut surface of earth; light stippling, loose soil. (One half natural size).

Upon digging up the nests of these bees, I was surprised to find that they extended no deeper than three or four inches. Most of the tunnels led straight down for an inch and then branched. So far as the galleries were open, it was clear which way they went. But when I reached the depth where they had been filled with soil, the passage-way was usually invisible. It blended perfectly with the surrounding clay. However, in a few instances, I was able to trace the galleries down to the cells. The general plan of these nests is shown in Fig. 1. The main tunnel usually branched once, and then the two passage-ways

[2]Miss Sandhouse informs me that *Spinoliella australior* visits the flowers of the following plants: *Dithyrea wislizeni, Cleome serrulata* and *Solidago canadensis*. The pollen of *Cleome serrulata* is somewhat green.

resulting from this gave off three or four short galleries each of which ended at a cell. Hence there were approximately six cells to each nest. If it is to be assumed that each female is capable of laying fifteen eggs, then more than one nest must have been provisioned by each bee. She probably finished one nest and then constructed another. Surely a female was not taking care of two nests simultaneously as has been observed in the case of *Dianthidium sayi* Ckll. The reason for the latter assumption lies in the fact that in one colony of *Spinoliella*, consisting of about forty nests, I collected thirty-seven females. Then, when it was visited a few days later, there were just four nests being provisioned by as many bees. This is conclusive evidence that there was but one bee to a nest and *visa versa*.

As in the case of *Perdita opuntiæ* Ckll.[3] the pollen is constructed into a sphere and one end of the egg is inserted into this.[4] Furthermore, the cells for the larvæ have their walls similarly smoothed as though the insect had lapped them with its tongue. And, finally, it is interesting to note that the larvæ of these two bees are almost identical. Each has the typical double row of spines down its back. Some of the larvæ of *S. australior* are just as white as are those of *Perdita opuntiæ*; others however, which have probably consumed an over-abundance of pollen, are somewhat yellow.

In the key by T. D. A. Cockerell and W. W. Robbins ('10) the bees of these two genera differ principally from one another in the length of the marginal cell. In *Perdita* it is short and broadly truncate; in *Spinoliella* it is narrow and long.

It is hoped that further comparative work can be done on the nesting habits of *Perdita* and *Spinoliella* which resemble one another in so many respects.

[3]See Custer ('28).

[4]Malyshev ('25), in Russia, states that the larvæ of *Systropha planides* so start eating the pollen ball that it lies on their ventral surface, on top of them, thus preventing it from drying out from coming in contact with the cell wall. In the nest shown in Fig. 1 above, I found a larva in a similar position. This larva is pictured directly beneath the entrance.

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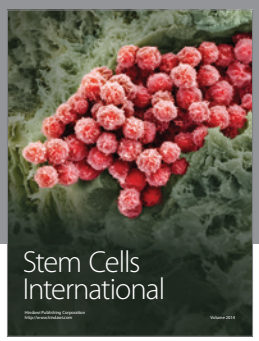

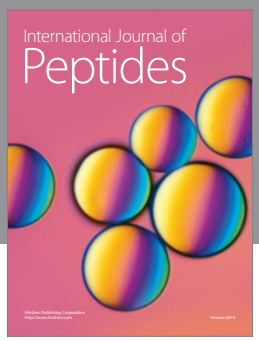

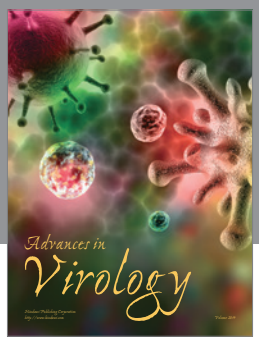

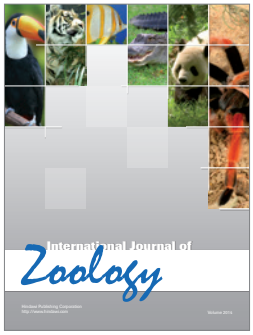

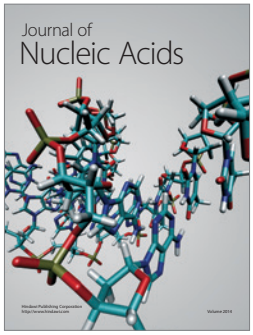

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