

Digger Wasp



Wasps of the genus *Sphex* (commonly known as **digger wasps**) are cosmopolitan predators of the family Sphecidae that sting and paralyze prey insects. There are over 130 known digger wasp species. In preparation for egg laying they construct a protected "nest" (some species dig nests in the ground, while others use pre-existing holes) and then stock it with captured insects. Typically the prey are left alive, but paralyzed by wasp toxins. The wasps lay their eggs in the provisioned nest. When the wasp larvae hatch, they feed on the paralyzed insects.

A well-known species of digger wasp is the great golden digger (*Sphex ichneumoneus*) which is found in North America. The developing wasps spend the winter in their nest. When the new generations of adults emerge, they contain the genetically-programmed behaviors that are required to carry out another season of nest building. During the summer, a female might build as many as half a dozen nests, each with several compartments for her eggs. The building and provisioning of the nests takes place in a stereotypical, step-by-step fashion.

Some *Sphex* wasps drop a paralyzed insect near the opening of the nest. Before taking provisions into the nest, the *Sphex* first inspects the nest, leaving the prey outside. During the wasp's inspection of the nest an experimenter can move the prey a few inches away from the opening of the nest. When the *Sphex* emerges from the nest ready to drag in the prey, it finds the prey missing. The *Sphex* quickly locates the moved prey, but now its behavioral "program" has been reset. After dragging the prey back to the opening of the nest, once again the *Sphex* is compelled to inspect the nest, so the prey is again dropped and left outside during another stereotypical inspection of the nest. This iteration can be repeated again and again, with the *Sphex* never seeming to notice what is going on, never able to escape from its genetically-programmed sequence of behaviors.

In addition to this seemingly instinctive and programmed behavior, the *Sphex* has been shown, as in some Jean Henri Fabre studies, not to count how many crickets it collects for its nest. Although the wasp instinctively searches for four crickets, it cannot take into account a lost cricket, whether the cricket has been lost to ants or flies or simply been misplaced. *Sphex* drags its cricket prey towards its burrow by the antennae; if the antennae of the cricket are cut off, the wasp would not think to continue to pull its prey by a leg.