

THE YEAR OF THE WASP

SPRING 2013

PHOTOGRAPHS BY
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A Cycle Completed

Through the summer and into the fall, we have photographed the development of a colony of paper wasps (*Polistes sp.*, probably *P. metricus*) that conveniently decided to build on the door frame just above our garage door. We have featured pictures and descriptions in previous notes, but since fall has come, and the colony's life has ended, it seems appropriate to recapitulate its short life. Some of the photographs have appeared in previous editions of the notes, but it is necessary to repeat some of them to complete the story.



This is an early stage in the development of a nest. The adult pictured is the foundress, a female who was fertilized last fall and overwintered in some sheltered spot. In the spring, she began to construct a nest and lay eggs. This nest contains only four cells and early stage larvae. The petiole (stalk) attaching the nest to the trim above our garage door can be clearly seen. The petiole is coated with compounds that repel ants, potential predators of the larvae and eggs.



The colony grows larger. Still the foundress is the only adult present. Inside the individual cells can be seen eggs (outer cells), larvae (second row of cells), and pupae (the silvery-colored closed cells in the center). Up to this point, the foundress has done all the work. She has collected wood fibers to make the paper for the nest; she has laid the eggs, and she has hunted prey (mostly caterpillars) to feed the larvae. When some of the pupae hatch, she will have help.



The foundress is impressive in a close-up view.



The colony now has two adults, the foundress and a recently emerged sterile female that will function as a worker. I believe the foundress is the wasp on top of the nest, because its wingtips are slightly frayed, possibly from all the work required to single-handedly construct the colony and feed the developing larvae up to this point. However, I am not sure, because, unlike a queen in a honeybee colony, the foundress of a paper wasp colony is not very different-looking from her daughters, who are the workers. The foundress normally lays all the eggs in the colony.



Seven adults can be seen in the colony at this time, and there may be some more out foraging to feed the larvae. Larvae in various stages of development can be seen in the colony, and two pupal cells are present in the lower right part of the colony and one in the middle left part (under the leg of an adult).



Sadly, another foundress tried to form a colony right above our front door. When the storm door would swing open, the wasps would become very irritated, and arriving (human) guests were alarmed. Although I hated to do it, I destroyed the young colony with insecticide. However, this did give me the opportunity to dissect the nest and photograph the various larval stages. Here, on the left are two eggs marked by the black ovals. Progressive stages in larval development are shown to the right with an adult on the far right. The eggs are glued to the paper of the nest. Since the nest is constructed with the cells opening toward the ground, the eggs have to be glued in to keep them from falling out. The larvae are not attached to the nest and are themselves responsible for holding on to the walls of their cells so that they do not fall out. The larvae (or grubs as they are sometimes called) look quite plump and juicy. One would think they would be a tempting meal for some predator, and indeed they are. Known predators include foxes, various rodents, and several species of birds, such as Cardinals (*Cardinalis cardinalis*), Scarlet Tanagers (*Piranga olivacea*), Red-winged Blackbirds (*Agelaius*

phoeniceus), Baltimore Orioles (*Icterus galbula*), and doubtless many other species. The Summer Tanager (*Piranga rubra*), common in our area, specializes in eating adult bees and wasps. Many bird species will knock the entire nest down and eat the larvae. Ants will swarm over the nest and eat the larvae and eggs.

The photograph to the left shows the nest I had to destroy. The stalk through which the nest was attached is at the upper left. The wasps often coat the stem with ant-repellant chemicals, as I mentioned earlier, and a worker is often stationed on top of the nest near the stem to detect impending ant attacks.



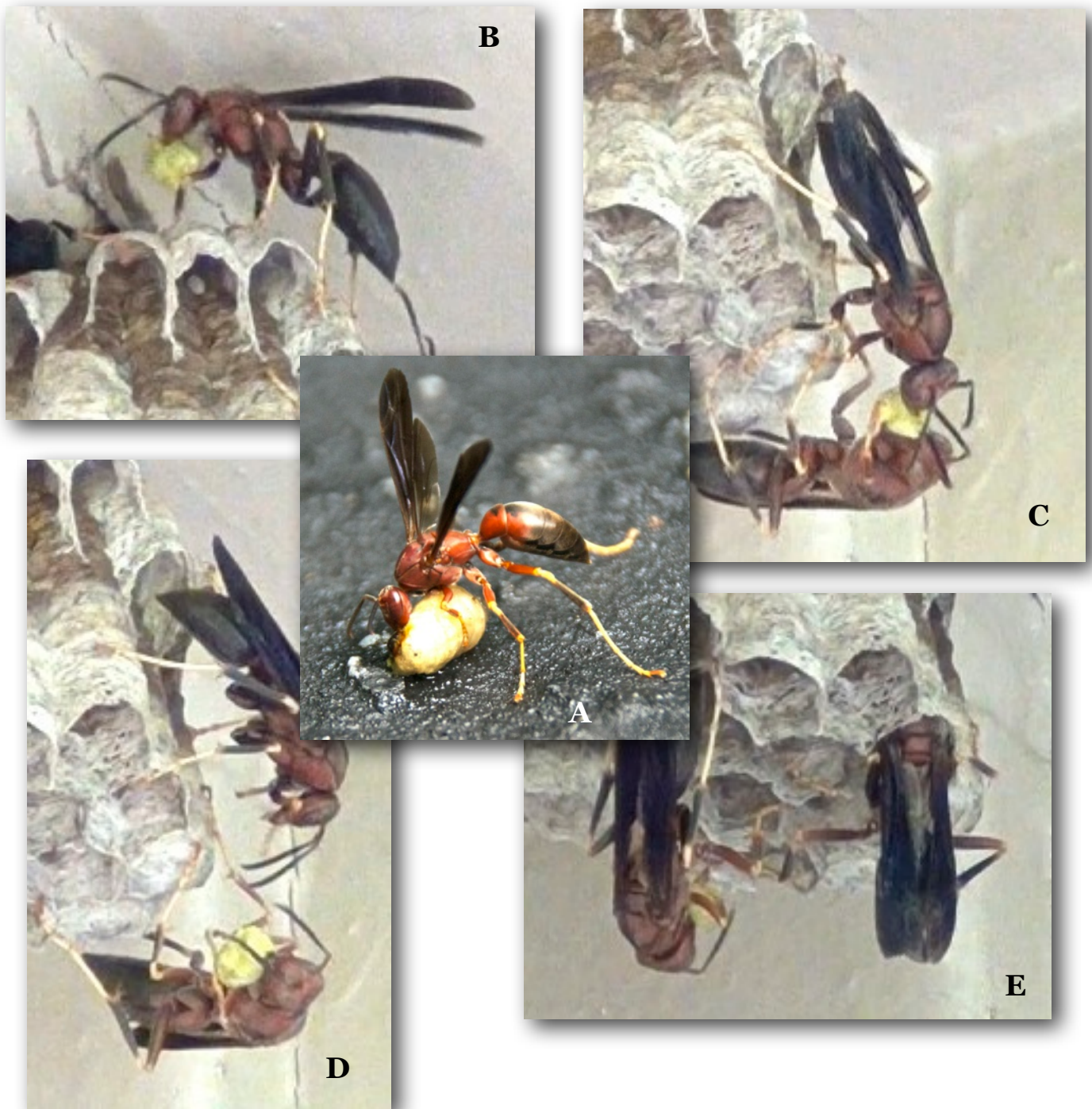


By late summer the wasp (*Polistes sp.*) colony has grown quite large. I can count at least 78 cells in the photograph above. In the fall, all the workers will normally die. Only the foundress will overwinter to start the entire process all over again.



The top photograph shows a wasp that has just returned to the nest with a gray ball of chewed-up wood. This ball was passed off to the wasp on the right, and it proceeded to use the wood to make paper and extend the walls of one of the cells of the nest. The middle photograph shows the wasp searching for an appropriate cell. The bottom photograph shows the wasp lengthening the wall of a cell. It did this by backing around and around the cell, chewing the wood with its mandibles, and applying it to

the edge of the cell. Meanwhile one antenna was flitting around the inside wall of the cell and the other around the outside wall as if to measure the thickness of the newly formed cell wall. In the bottom photograph, the newly formed paper can be distinguished by its slightly darker color (arrow).



Paper wasps mostly feed their young with caterpillars. Pieces of the caterpillars are chewed up into a formless mass and brought back to the nest as food for the developing grubs. In this series of photographs, a wasp has captured an insect larva (A) a wasp returns to the nest with a green ball of caterpillar (B). This is passed on to a nest mate (C). The second wasp chews on the caterpillar material for a while, and ingests some of it (D). Finally, the wasp enters a cell to feed one of the young grubs with regurgitated caterpillar (E). The older grubs can bite off pieces of the caterpillar mass. Interestingly, the adults do not themselves eat caterpillars. They live on nectar. However, they probably ingest some of the juice from the caterpillars they masticate to feed the larvae.



Early in the season, the female lays only eggs that develop into female adults. These are the workers, who help the foundress increase the size of the colony and feed the larvae. Late in the season, the foundress lays eggs that develop into males. Males are very striking, with bright yellow u-shaped markings on their heads. Their antennae curve into a hook at the very end. When courting the females, the male uses this hook to snare the female's antennae and stroke them. A male (right) and a female are compared in the bottom photograph.



Several males left the nest and gathered a few feet away behind a metal ornament on the wall of our house. Such an accumulation of males has been observed in birds, such as prairie chickens, where the males gather and display to impress females. This behavior is called lek formation. In our case, the males formed a lek behind the metal ornament. The photograph above shows one of the males in the lek. In the bottom photograph a female has approached the lek, and a male has grasped her in an attempt at courtship. Some of these late season females will survive the winter and found new colonies in the next spring.



The nest is abandoned by fall. All the workers and males normally perish; only the next generation of foundresses will survive.

I pulled the abandoned nest off to examine the bottom of it. I did not make a careful count, but at least 150 cells are present.

So the next time you see a colony of paper wasps, don't automatically grab for the bug spray! Take the time to watch these interesting little creatures.

