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Agelaia multipicta (Haliday) is a widespread swarm-founding social wasp found throughout most of Central America and tropical South America (Richards 1978) and one of 20 species of swarm-founding wasps found in Trinidad, West Indies (Starr and Hook 2003). As far as is known, its nests of several parallel combs are always built in cavities and without envelopes (Richards 1978). Vertebrate carrion is among *A. multipicta*'s main food sources (O'Donnell 1995; Moretti *et al.* 2011). Despite the extreme patchiness of this resource and its large colony sizes, there appears to be no food source communication among nest mates (Jeanne *et al.* 1995).

In November 2012 a colony of *A. multipicta* was found occupying a bird box in a garden in the Lopinot Valley of Trinidad, West Indies (10°40'N, 61°20'W). The nest box had an internal volume of 3.36 liters and three apertures that could serve as entrances and/or exits. Two of these were circular holes in the front board of the nest box with diameters 13 mm (A) and 32 mm (B). At the back was a low, rectangular aperture 10 x 100 mm (C), where the back panel did not reach the base. There was no evident attempt to narrow or occlude any of the openings with nest carton.

This presented an opportunity to study the movement of wasps in and out of the nest in order to determine whether one hole was preferred as an entrance and another an exit. Studies of one colony of the swarm-founding wasp *Synoecca septentrionalis* (Starr 1989) and three of the stingless bee *Hypotrigena gribodoi* (P.E. Asante and C.K. Starr, unpublished) with doubled entrance tubes showed a clear directional bias between tubes in each case. In these species, a doubled passageway is a building anomaly, while in *A. multipicta* it was a pre-existing feature of the nest cavity.

During the course of one day, the numbers of wasps entering and leaving the nest through each of the holes were recorded for six ten-minute periods at two-hour intervals from 0800 h to 1815 h. One observer recorded traffic through each hole at the front of the box, while a second observer did the same for the single hole at the back. Observations were made from a distance of about two metres, with observers alternated front and back for successive counts. The wasps had been habituated to human presence for at least one year and showed no signs of disturbance at this distance. On the day of recording the weather was bright and fair.

A total of 2427 wasps entered or exited during the observation period, with most of the traffic through opening B (Table). The most striking result is that opening C at

Table. Movement of *Agelaia multipicta* individuals in and out of three nest openings during one day.

Opening	A	B	C	Total
Perimeter of opening (mm)	41	100	220	
Wasps entering	8	1402	4	1414
Wasps exiting	4	860	149	1013
Total traffic	12	2262	153	2427

the back of the nest box served almost exclusively as an exit. Combining openings A and B, we find that the wasps preferentially utilized the front as an entrance and the back as an exit ($\chi^2 > 100$, $p < 0.001$). The result is the same if we disregard opening A.

We hypothesize that the differentiation into entrance and exit in this nest arose over time through a process of consensus building. This is open to test and description if a way can be found to induce swarms to adopt artificial nest boxes.

The pattern of overall traffic during the day showed a peak during mid-morning, followed by a lull at midday and a higher peak in the late afternoon. A more rigorous study over several days would be required to confirm this trend.

At the same time, we took the opportunity to study the nest and colony composition. At the time of observation, the colony had been in place for at least a year (personal observation). Few nests of *A. multipicta* have been described, probably because of the difficulty of collecting them from their cavities. Jeanne (1991) does not include any colony sizes for this species.

We collected the colony at night with the aid of Abraham Hefetz. It is standard practice to collect colonies at night, when few or no wasps are away from the nest. In addition, in the case of a potentially dangerous species such as *A. multipicta*, night collecting affords the option of turning out the lights if things go wrong. About 50 additional wasps were found at the nest site the following day, apparently having overwintered away. We killed and preserved the entire colony by freezing it.

The nest consisted of nine approximately vertical combs, with neighbouring combs connected by multiple petioles. The overall surface area of the combs was estimated at 1103 cm² by means of a 1cm x 1cm transparent grid laid over each comb. The total number of cells was estimated at 10,892 by counting the cells in 10 grids of 4 cm² laid haphazardly on combs. Nests with horizontal

combs are also known from this species (Giannotti 1998).

The number of adult wasps was estimated volumetrically. The collected wasps occupied 20 vials of 30 cm³ of which we counted the wasps in eight vials chosen haphazardly. This yielded an estimate of 3957 wasps. Together with the wasps that returned the following morning, the entire adult population of the colony was about 4000.

The colony composition, based on a haphazard sample of 200 adult wasps, is estimated at 1380 callow (recently emerged) females, 2580 fully mature females and 40 fully mature males. Fully mature individuals are readily distinguished from callows by eye colour; immediately after emergence, the compound eyes of both females and males are black, changing to grey or greenish grey as the cuticle hardens. Dissection of a sample of 100 fully mature females showed only one with developed ovaries, indicating that the colony had very few queens. This one queen stood out for having a somewhat swollen abdomen and a very mature overall appearance. The presence of males shows that the colony had reached reproductive maturity. Richards (1978: 254) mentioned a colony of *A. multipicta* with more than 5000 adults, and data from four other *Agelaia* species (Jeanne 1991: Table 6.5) suggests that mature colony sizes from several hundred to several thousand are normal for the genus.

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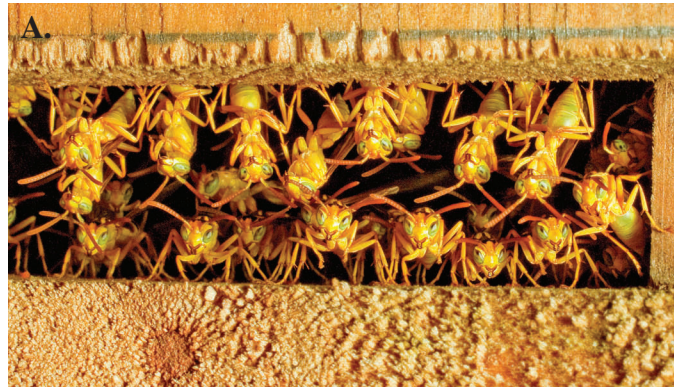


Figure. **A**, rear opening and **B**, front opening of bird box inhabited by a colony of *Agelaia multipicta*.

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