

***Passaloecus monilicornis* (Hymenoptera: Crabronidae) nesting in an artificial nest**

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Eleven species of little sphecoid wasps of the genus *Passaloecus* SHUCKARD, 1837 are known from the Czech Republic (BOGUSCH et al. 2007). Most of the species inhabit forests or forest margins, some are thermophilous and some occur only in highlands. Most of them nest in wood using cavities made by beetles or other wood consuming insects. Because the body length of adults is usually 6 – 8 mm, they usually nest in holes with very small diameter. Females use tree (spruce or pine) resin as a building material for bars between brood cells and a pad on the surface of the wood. For provisioning they hunt aphids of various taxa (O'NEILL 2001). Several species are common (*P. singularis* is the most common in lowlands, *P. corniger* and *P. insignis* in higher latitudes), but especially *P. monilicornis* is a very rare species recently collected only in some parts of southwestern (BOGUSCH & STRAKA 2006) and northwestern Bohemia (VEPŘEK 2006, L. BLAŽEJ, pers. comm.). Using two types of artificial nest sites for solitary bees of the family Megachilidae, *P. monilicornis* was nesting in one of these in the years 1999 and 2000. Because the biology of this rare species is probably not well known, I try to describe here nesting habits I observed.

Material and Methods

Artificial nest sites were installed in the locality Buzice in southwestern Bohemia (faunistic square 6549) in years 1999 to 2001. There were used two types:

- a) “Fabre trap” – a bunch of about 30 cm long reed stalks (which is used mainly for solitary wasps of the genus *Ancistrocerus* WESMAEL, 1836), constructed according to ZÁHRADNÍK (1990);
- b) Wooden nest site constructed according to JUNG (1996) – it looks like a bird box but the front is penetrated by glass tubes reaching about 6 – 10 cm to the inside of the box. The left side has a “door” for opening, so we can control the inside of the nest site anytime we want (see Fig. 1).

Nest sites were controlled every week, nesting species were determined and nest types and larvae in brood cells were observed. I drew nest types of all observed species (see Fig. 2).

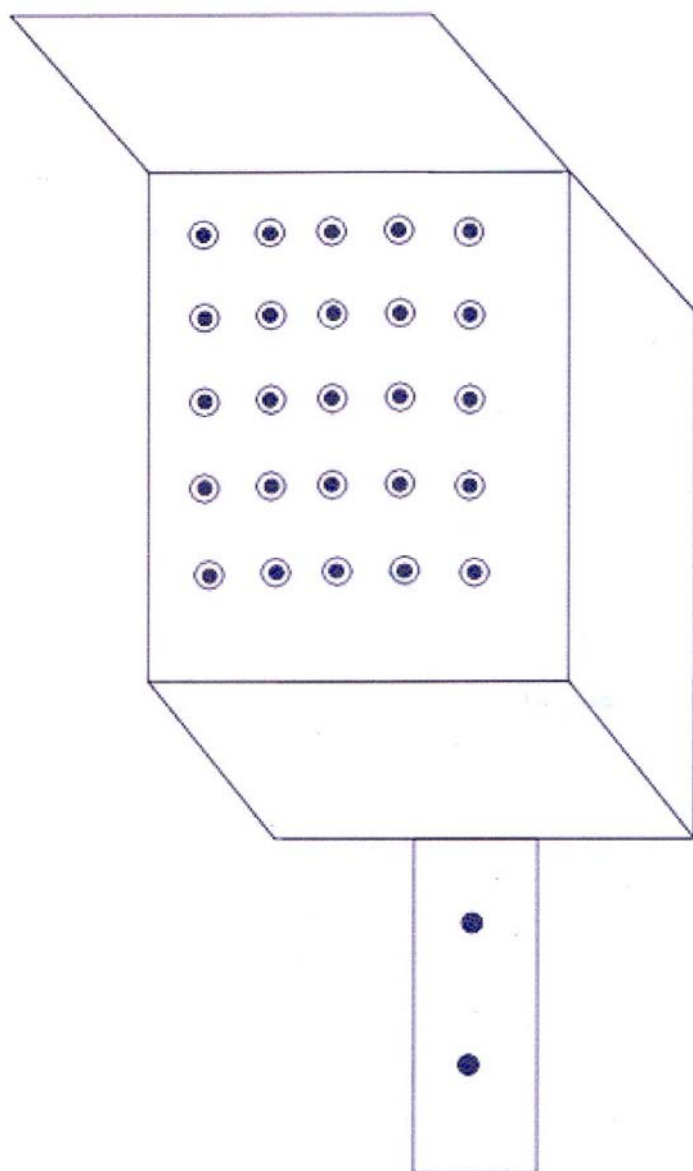


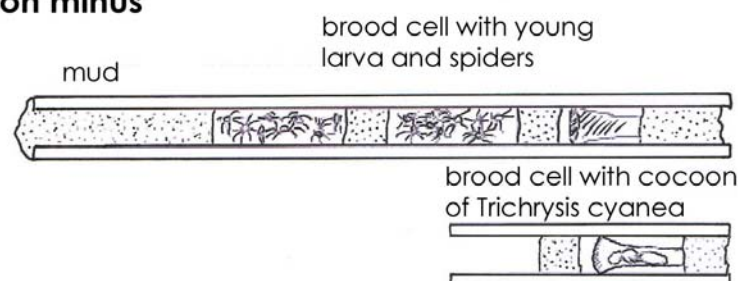
Fig. 1: Wooden nest according to JUNG (1996) by front view. Orig. P. BOGUSCH.

Nesting of *Passaloecus monilicornis*

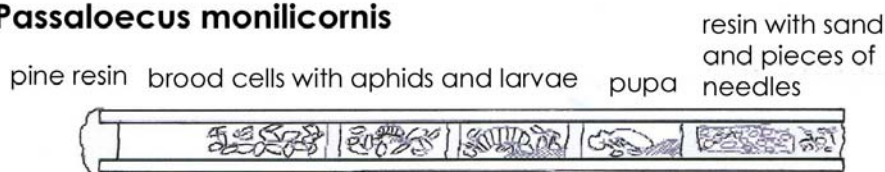
The sphecid wasp *P. monilicornis* was nesting in the wooden nest site placed at the sandy path in a pine forest, in a height about 1.50 m on the bark of one spruce tree. In the year 1999, one female constructed three nests. They were placed in glass tubes of an inner diameter 4 mm. Two nests had six, one four brood cells; aphids of the family Adelgidae were put in every brood cell as well as one *P. monilicornis* egg. Bars between brood cells were very thin and all of them were made only of the resin. The pad closing the entrance to the nest was made of a resin mixed with sand or dead plant tissue (old grass leaves, pieces of needles, etc.) and the back barrier was made of sand grains and small pieces of needles. One male was reared from the nest on 13th May

2000. In the year 2000, one female built five nests. Two nests with five brood cells, nests with eight, six, and two brood cells were made once. The smallest nest was being built at the end and the female probably died during the nest preparing because the nest stayed opened. Structure of nests was similar with those built in the year 1999. However, the number of reared brood was very low, because only one male hatched on 27th March 2001. In my opinion the glass as the material of nest walls caused the low number of hatched imagines because it does not transmit water and air. Thus most of the larvae were killed by molds, which grew in the glass brood cells without any ventilation. Higher number of adults certainly survives in artificial nest sites made fully of wood (blocks of wood with drilled holes). No parasites or parasitoids were observed in the nests of *P. monilicornis*.

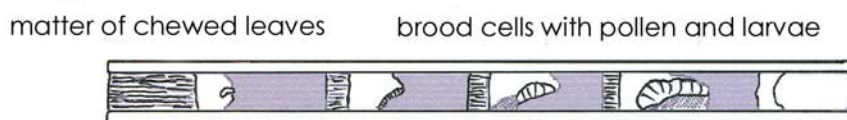
Trypoxylon minus



Passaloecus monilicornis



Megachile versicolor



Heriades truncorum

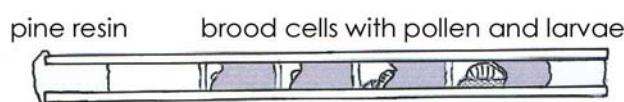


Fig. 2: Nest structure of some of the nesting species. Orig. P. BOGUSCH.

Nest building females were first observed on 18th July 1999 and 29th June 2000. They had the nests finished very early; the construction of every nest was only two to four days long. They worked steadily with no breaks; only in bad weather (from 22nd to 24th July 1999 and on 11th August 2000) they were not observed at the nest site. Three nests in the first year were finished on 29th July 1999, five in the second year on 14th August 2000. Both females were flying every several (from 2 to 23, the time was not

observed in detail) minutes away and were bringing aphids, stones or pieces of dead plants (usually needles) and balls of resin. No female was observed collecting material or catching prey in the vicinity of the nest. Resin collecting was observed at the related species *P. borealis* Dahlbom, 1844 in the same locality on 24th June 2007. The female was collecting the resin on a spruce trunk using mandibles and front legs. When she made a small ball (a little larger than her head), she flew away carrying it in the front and middle legs.

The larval stage of *P. monilicornis* from the first instar to the beginning of the last was quite short, usually not longer than three weeks. Reaching the praepupal stage (usually on the end July), the larvae did not change as well as during the hibernation in winter. In this time most of them were killed by molds. The brood cells were put into the fridge on 20th November and put outside next year in March. All larvae very early made cocoons and pupated. Pupal stage was only about three weeks long. Imagines reared and stayed several hours or days in the brood cell. After that, biting with their mandibles, they found the way outside of the nest.

Other nesting bees and wasps

Several other species of aculeate Hymenoptera were nesting in artificial nests in the years 1999, 2000 and 2001. Nests of these hymenopterans are drawn on Fig. 2. Here is the list of them with some notes:

Ancistrocerus nigricornis (CURTIS, 1826) – one female emerged from Fabre trap at Hadí rybník pond near Blatná (10th May 2001);

Heriades truncorum (LINNAEUS, 1758) – this small bee was commonly nesting in both artificial nest sites and built many nests there. The nests were made of resin and were filled with yellow-orange pollen of Asteraceae. Two males and five females emerged from the nests;

Megachile versicolor SMITH, 1844 – this common bee was nesting in the box nest site wood margin over the sandy slope (the other nest than *P. monilicornis* was nesting). Nests contained only 2 to 4 brood cells with thick gap made of chewed leaves; brood cells were filled with violet pollen of Fabaceae. The female “lived” in bad weather conditions in the newest brood cell;

Rhopalum clavipes (LINNAEUS, 1758) – one female was nesting in the box nest site. The nest was not in detail observed, one female emerged on 9th June 2000;

Stelis breviscula (NYLANDER, 1848) – this cuckoo bee is a well known nest cleptoparasite of *Heriades truncorum* (see WESTRICH 1989). One female reared from the nest of its host on 20th June 2002;

Trichrysis cyanea (LINNAEUS, 1761) – this parasitoid of various aculeate Hymenoptera was very common in nests of *Trypoxylon minus* and only imagines of this parasite emerged;

Trypoxylon minus BEAUMONT, 1945 – this very common sphecid wasp was nesting in holes in wood. Many females were nesting in box nest sites, they were not in detail observed. All were collecting little spiders. The nest was made of mud (all gaps and bars), brood cells were filled with spiders and only one egg was in every brood cell. The nests were very much parasitized with *Trichrysis cyanea*. Majority of larvae in brood cells very early died on molds, only two parasitoid larvae pupated and two imagines emerged.

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