

Trapping the digger wasp *Pemphredon lethifer* (Sphecidae) with trap nests

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Twig nesting digger wasps of the genus *Pemphredon* use aphids as food for their brood. The wasps transport the aphids to their nests which they dig into twigs. They could therefore be relevant as beneficial organisms for aphid control. In particular, the species *Pemphredon lethifer* (Shuckard 1837) is of interest here, as it is widespread and has low habitat demands. To start continuous rearing systems of *P. lethifer*, a large quantity of individuals is required. The aim of this study is to examine trapping systems to trap *P. lethifer* individuals. Trap nests have been widely used to trap wasps of the genus *Pemphredon* for monitoring purpose. However, there is no information about mass trapping of *P. lethifer* for rearing purposes. To approach an optimized trapping system, the parameters such as duration of nesting process and the resulting optimal sampling intervals are investigated.

In the year 2022, at each of 28 study sites in Braunschweig and the surrounding area three trap nests were installed in May. The study sites were chosen based on the preferred nesting plants of *P. lethifer* *Sambucus* spp. and *Rubus* spp.. The trap nests consist of 16 30 cm long twigs of *Sambucus*. The twigs were tied together with wire. Trap nests were hung into *Sambucus* or *Rubus* branches and were oriented east-to-west. The nests were checked weekly for signs of nesting. As soon as signs of nesting were visible, the twig was marked with a dot. Twigs with signs of nesting were removed a) one week after the first sighting (1 dot) or b) two weeks after the first sighting (2 dots). Removed twigs were replaced by new ones. Nests were reared in the laboratory by 25° C. Adult wasps, which were present in the nests, were collected and identified. All emerged wasps and parasitoids were counted and determined.

Nesting activity in the field was from May until the End of August with peaks at the beginning and the end of June. Preliminary results of this year's investigation show, that the number of digger wasps emerged from trap nests left in the field for two weeks was higher than for nests left in the field for only one week. Hence, we conclude based on the current findings, that *P. lethifer* usually needs an interval longer than one week to complete the nesting process. To establish a rearing system, nests of *P. lethifer* should stay in the field for at least two weeks to maximize the number of emerging wasps.

The preliminary results only consider wasps that emerged without diapause. In order to draw a final conclusion, wasps with an obligatory diapause must also be considered. To initiate diapause twigs are chilled.

The findings are crucial for establishing a successful rearing of digger wasps to use them as beneficial organism in high quality horticultural crops.