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# Identification of the activity patterns of two species of ants of the *Tapinoma nigerrimum* complex

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**Introduction:** Ants are a major component of soil biodiversity and some of them are among the worst invasive species<sup>1</sup>. Recently, 3 ant species belonging to the *Tapinoma nigerrimum* group<sup>2</sup> have been identified as invasive at the European scale, and in particular in the Mediterranean region: *T. ibericum*, *T. darioi* and *T. magnum*, with *T. darioi* being more abundant<sup>3</sup> in the French and Spanish coasts.



Credit: R. Blatrix

**Aim:** We tried to identify potential differences in activity patterns between i) the two *Tapinoma* species and ii) *Tapinoma* sp. and other observed species. These data should reveal differences in environmental tolerance between the two *Tapinoma* species that could explain their distribution in their area of introduction.

**Methods:** We selected 3 colonies of *T. darioi* and 3 colonies of *T. magnum* in Montpellier area (Southern France, Fig. 1). Activity level was recorded regularly between November 2021 and August 2022. The sites were chosen to form diads, each grouping one nest of *T. darioi* and one nest of *T. magnum* geographically close. At each visit, 18 baits were arranged in transects around one of the main nest entrances (Fig. 2). Baits consisted of peanut butter, tuna rilette and honey. Activity on the baits as well as air, soil and subsoil temperatures were measured.



Fig. 1: Localisation and context

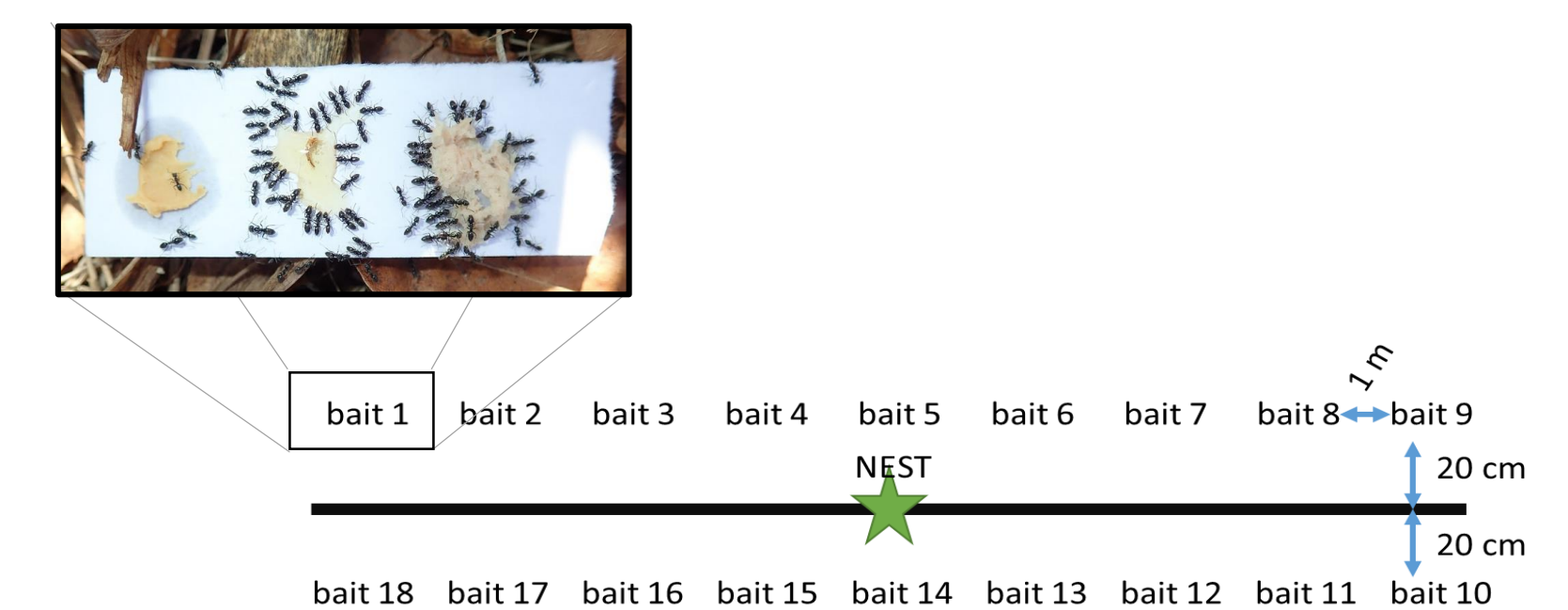


Fig. 2: Illustration of the transects and the baits

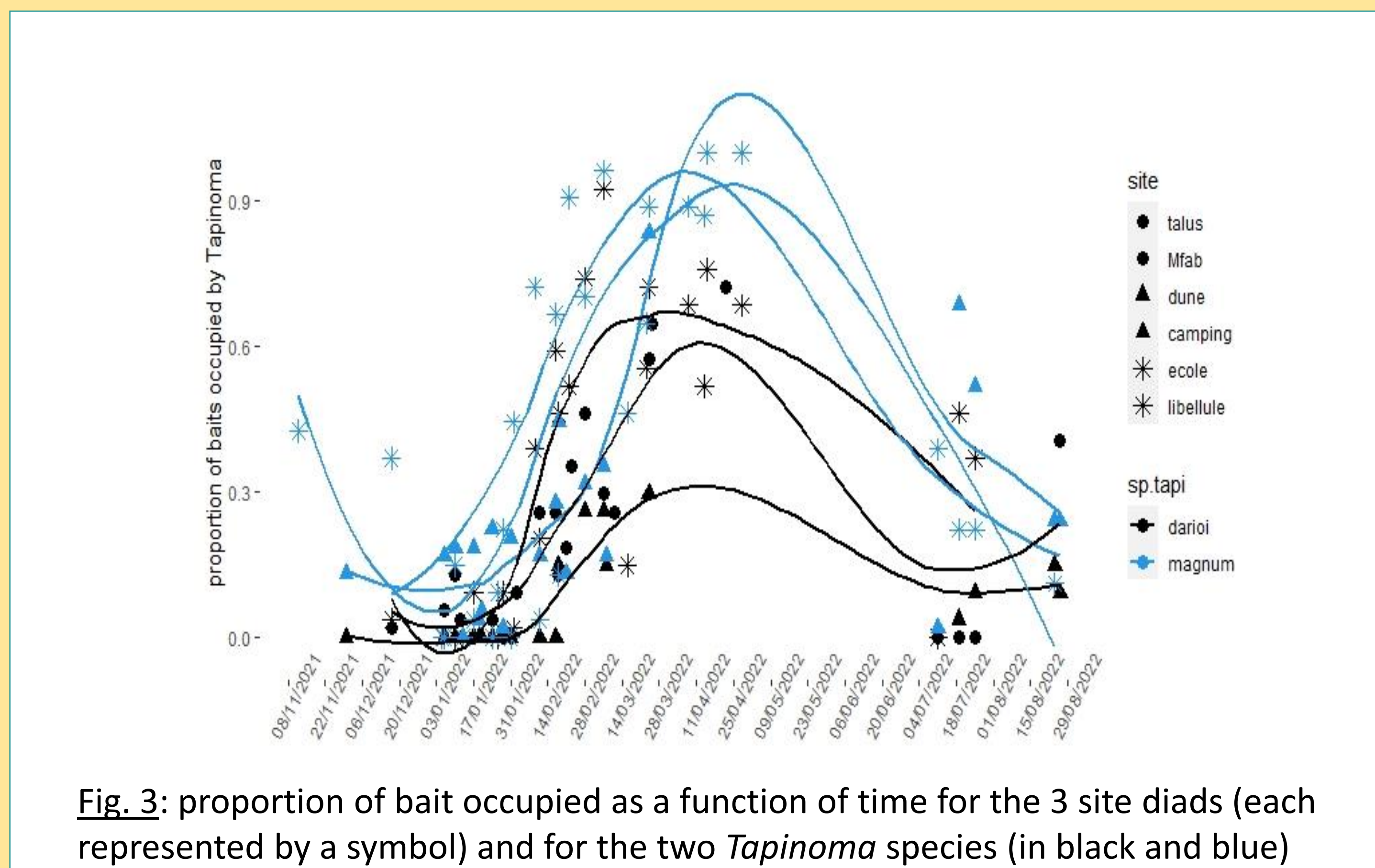


Fig. 3: proportion of bait occupied as a function of time for the 3 site diads (each represented by a symbol) and for the two *Tapinoma* species (in black and blue)

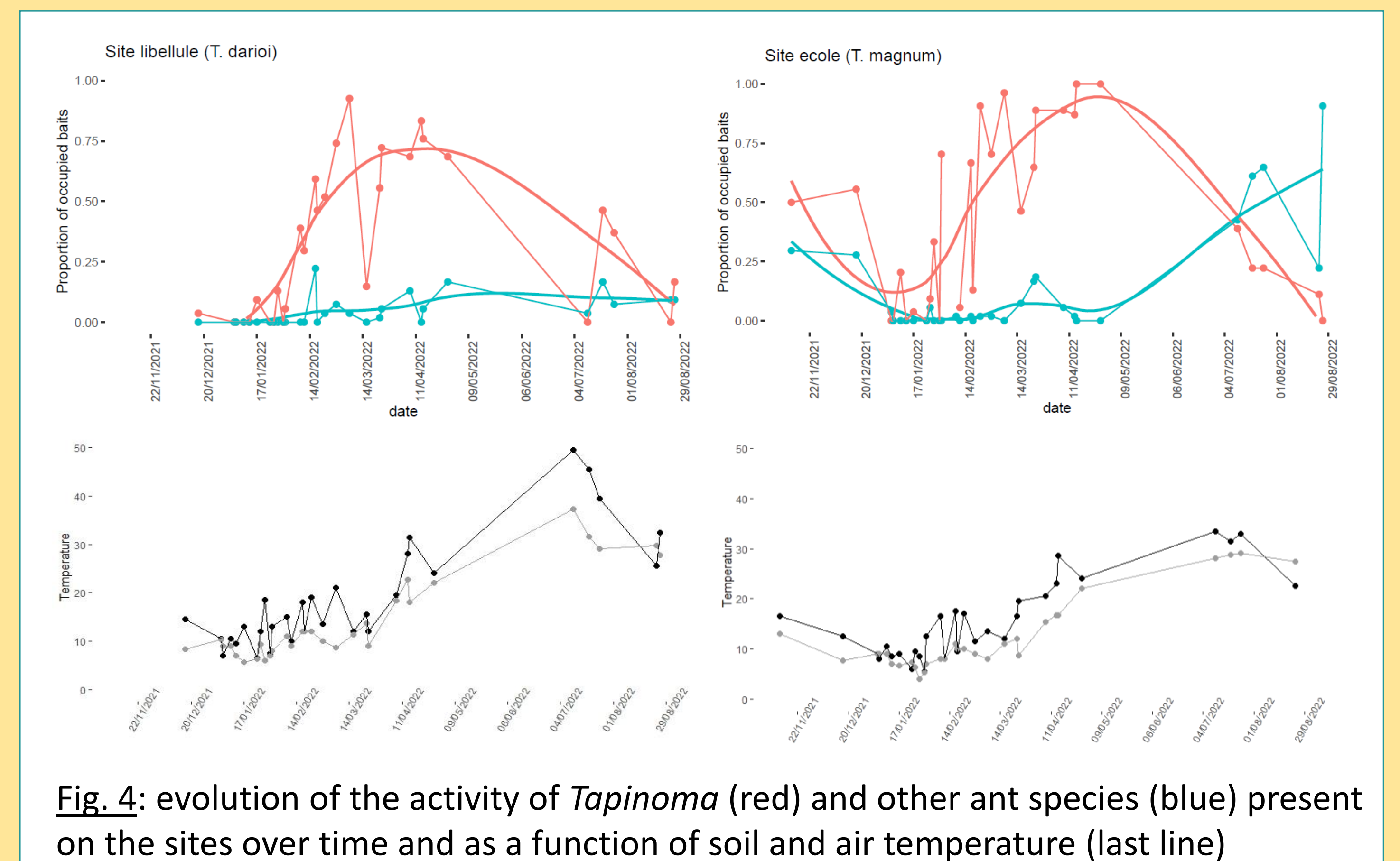


Fig. 4: evolution of the activity of *Tapinoma* (red) and other ant species (blue) present on the sites over time and as a function of soil and air temperature (last line)

## Results and discussion:

**1. *T. darioi* vs *T. magnum*.** Data revealed no apparent differences between the 2 *Tapinoma* species: both were active all year long, including during the coldest months and showed a peak in activity in spring and early summer (Fig. 3). These preliminary results suggest that the two *Tapinoma* species do not differ on their temperature tolerance, which therefore might not be the main factor explaining the differences in their distribution.

**2. *Tapinoma* species vs other ants.** Ten other ant species were observed at baits (mainly *Camponotus*, *Linepithema*, *Pheidole*, *Messor*, *Plagiolepis*, *Temnothorax*, *Crematogaster*, *Tetramorium*, *Lasius* or *Monomorium*) but the two

- *Tapinoma* species are the only ones active in winter
- Activity of the other species tend to overtake that of *Tapinoma* during summer, even though observations were made on sites selected for their abundance in *Tapinoma* (Fig. 4)

These differences could be explained by different resource acquisition strategies.

**Application:** Control strategies should be applied in winter, when only *Tapinoma* species are active, in order to be more specific and avoid collateral damages on other ant species.

**References:** 1- Bertelsmeier *et al.*, 2016. Invasions of ants (Hymenoptera: Formicidae) in light of global climate change. *Myrmecol. News*, 22: 25–42. 2- Seifert *et al.*, 2017. Four species within the supercolonial ants of the *Tapinoma nigerrimum* complex revealed by integrative taxonomy (Hymenoptera: Formicidae). *Myrmecol. News*, 24:123–144. 3- Centanni *et al.*, 2022. High resolution mapping in Southern France reveals that distributions of supercolonial and monodominant species in the *Tapinoma nigerrimum* complex (Hymenoptera: Formicidae) are related to sensitivity to urbanization. *Myrmecol. News*, 32: 41–50



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