

Letter

Response to Genovesi *et al.*: Ant biosurveillance should come before invasion

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Invasion biology has widely described how successfully preventing the spread of invasive alien species benefits from early detection and action¹. However, border interceptions miss many soil-dwelling ant species that establish and are often first noticed by chance^{2,3}. Upon our recent discovery of the first

European population of the red imported fire ant *Solenopsis invicta*, an invasive alien species of high concern⁴, Genovesi *et al.*⁵ proposed that scientific journals require authors to declare that they have adhered to regulations regarding invasive alien species. We join the call for clearer protocols for reporting invasive alien species along the publication process. At the same time, we must note that the peer-review process assures the quality of research, including the taxonomic identification of the reported species. In our case, the review process represented a very minor delay compared to the years that *S. invicta* must have been present in Sicily undetected and did not compromise conservation efforts. Unfortunately, given the scenario we presented in our study⁴ and the new data we provide here, the time for early warning and early action in Sicily seems to have long passed.

Genovesi *et al.*⁵ conjectured that, with a late report to the authorities, we

caused a delay in action of at least 10 months and implied a potential economic cost for it. This assumption is incorrect as it did not consider all the steps that were needed to identify the species unambiguously: about 10 months before the communication, we received a single blurry picture from a citizen who also mentioned stings. We proceeded with field surveys, morphological and molecular analyses, and review by experts. *Solenopsis invicta* is part of a complex taxonomic group containing about 13 species from Southern America⁶. Thus, we considered genetic identification and the assessment of reviewers to be crucial. The same day the review process ended (July 19th 2023), the authorities were informed, shortly followed by the official communication by the regional authority to the national one (August 4th). We consider that officially reporting the presence of an invasive alien species holding a special legal status, as is the case for *S. invicta* in the

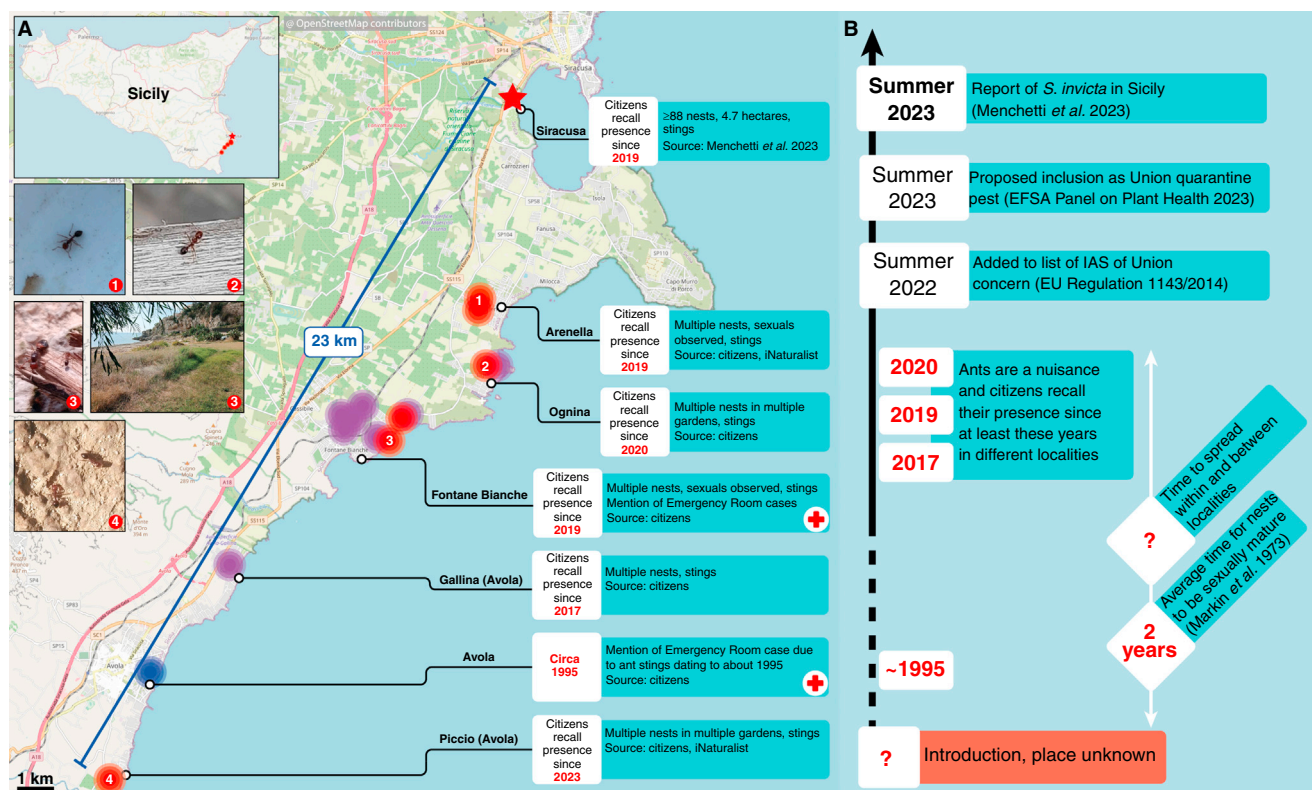


Figure 1. State of knowledge on the fire ant invasion in Sicily.

(A) Map of southeastern Sicily illustrating the new reports likely attributable to red imported fire ants (*Solenopsis invicta*) gathered by the authors during the period September–November 2023 (red circle, ant stings and pustules + ant photograph; purple circle, only ant stings and pustules; blue circle, putative old record of ant stings and pustules) in addition to the site published in Menchetti *et al.* 2023⁴ (red star). Photographs illustrate one record per locality. All the data have been communicated to authorities for further inspection. Map from OpenStreetMap available under the Open Database License (CC BY-SA 2.0). (B) Timeline summarizing the currently available information on the invasion history of *S. invicta* in Sicily.



EU, should not be done without certain identification, and that management of invasive alien species should be based on solid scientific evidence, particularly taking into account its high cost⁷.

We concur with Genovesi *et al.*⁵ regarding the importance of raising attention to the absence of a clear protocol for researchers reporting invasive alien species: reaching a consensus among all parties — scientists, journals, and administrations — on timing, channels, checkpoints and responsibilities for this process is indeed crucial to facilitate the exchange of important information while safeguarding all parties involved. However, we wonder if the enforcement of a declaration of report to authorities by authors should be implemented during the submission or requested at the acceptance of the manuscript. Indeed, the review process by experts lies at the core of scientific practice to minimise potential errors, speculation, or malpractice⁸. False or imprecise statements may compromise conservation action and, if disseminated by the media, could create a false alarm and eventually erode the trust of society in the scientific community.

As we pointed out in our study⁴, during 2023 locals informed us that stings by these ants date back to at least 2019 and their long presence in the region was also indicated by the number and size of mature nests. We also suggested that the site we had discovered was highly unlikely to be the first arrival point and the only invaded location. Now, thanks to the mediatic outreach of the publication, several citizens reported the presence of wide infested areas in additional localities, up to 23 km from the first site, since at least pre-COVID times (Figure 1 and Supplemental information). Citizens provided photographs when available and invariably recalled painful stings inflicted by ants followed by pustules, mentioning cases needing emergency room treatment. Considering the number and size of the colonies, their geographical distribution, their presence since 2017, and that colonies typically take two years to become sexually mature⁹, it seems likely that the arrival of *S. invicta* dates back at least eight years. Surprisingly, while reporting a fire ant infestation in the garden, a citizen mentioned another case dating back to circa 1995 with credible details, including ant stings and pustules needing

treatment in an emergency room. The opportunistic reports received in a few weeks probably depict only a part of the area where the species is present and further monitoring is needed to provide additional information about the time, course and magnitude of the invasion.

Biosurveillance did not detect this highly invasive species for years and the peer-review process, which followed our accidental finding, did not significantly delay the reporting of a well-established population of *S. invicta* in Europe. The 2017 EU risk assessment warning about *S. invicta* invasion capacities (Contract No 07.0202/2016/740982/ETU/ENV.D2), its addition to the list of IAS of Union concern in 2022, and the proposal for inclusion among Union quarantine pests in 2023¹⁰ were positive steps, yet biosurveillance of alien ant species requires more effort. In *S. invicta*, reported costs for post-invasion management measures (US\$ 1.57 billion) greatly outweigh the ones for pre-invasion strategies (US\$ 87.81 million)⁷. It is surprising that even possible medical cases did not raise the alarm, and it would be desirable that information on invasive alien species of Union concern is actively and preemptively spread to the public. Unfortunately, the national Italian websites providing information on invasive alien species mentioned by Genovesi *et al.*⁵, to this date (November 2023), still lack information regarding *S. invicta*, which is either not listed as an invasive alien species of Union concern or considered absent in Italy.

Taxon-wide citizen science platforms (e.g. iNaturalist.org) may help citizens without taxonomic expertise to identify alien species and authorities to detect them. Increasing the investment in biosurveillance and better coordinating authorities, researchers, citizens, and stakeholders (e.g. medical centres and pest control companies) may help cope with the threatening increase of biological invasions by reducing the dramatic gap between the arrival and detection of alien ant species. Increasing early detection efforts through the establishment of monitoring networks for invasive alien species, especially near ports of entry, is recommendable not only at a local scale but also globally. We agree that conservation action should come before publication but, most importantly in this case, ant biosurveillance should come before invasion.

SUPPLEMENTAL INFORMATION

Supplemental information includes one table and can be found with this article online at <https://doi.org/10.1016/j.cub.2023.11.055>.

DECLARATION OF INTERESTS

The authors declare no competing interests.

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