



The scientific value of small mammal observation reports – The project GeoMaus

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GeoMaus is a part of the website kleinsaenger.at, which provides information about the appearance, geographic range, ecology and protection of small mammals. Since the year 2012 it enables users to report observations online. In this way GeoMaus collects data of the distribution of small mammals in Austria, Germany and Switzerland.

Involving amateurs or nonprofessional scientists in ecological research is widespread and becoming increasingly popular (e.g. Cohn, 2008, Silvertown, 2009, Dickinson et al., 2010). One good example is the collection of distribution data in ornithology: since 1774 people interested in nature are involved in migration research by recording observations (Greenwood, 2007), and many organizations like Birdlife nowadays use volunteers to gain information about species distribution. In contrast the knowledge about the distribution of many small mammal species is sparse. Their small bodysize, nocturnal activity and their frequent occurrence in often impassable surroundings makes observations challenging. In addition, certain species can only be determined by experienced specialists e.g. a reliable distinction of woodmice (*Apodemus sylvaticus*), yellow-necked mice (*A. flavicollis*) and alpine field mice (*A. alpicola*) is often only possible by comparing cranial features (Jenrich et al., 2010, Turni, 1999, Marchesi et al., 2008). Unfortunately, this results in complex and expensive research methods, thus the collection of information is widely based on random observations e.g. carcasses, roadkill or cat captures. A vital aspect of the GeoMaus project is to collect these accidental recordings, verify them and make them available for interested people and further research.

But how to classify the input quality from amateurs and non-professionals from the scientific point of view?

At first, to avoid errors it is highly important to provide adequate background knowledge to all people involved (Cohn, 2008). For this GeoMaus provides tools to facilitate correct species determination: a picture key for inexperienced users as well as a text-based dichotomous key with body and skull features for professionals. Each report has to comprise locality, date, habitat, type of record and the contact details for further queries. These information have to run through a plausibility check that covers a review of the external species characteristics, the potential distribution and the habitat.

The quality level also depends on the species of the small mammal observed. Many species show certain characteristics that make them easily distinguishable even in the field. For example the striped field mouse (*Apodemus agrarius*) shows a remarkable dark line that covers the back from head to tail and dormice can easily be determined through their tails and fur colorations. In these cases the number of uncertainties or false determinations is low. On the other hand there are groups that aren't that simple e. g. the voles. In these cases reports that are not fully unmistakable are only seen as "indicators" or "hints" on a potential abundance.

Records with photos showing the characteristics appearance of a species can be evaluated as high quality observation. So on GeoMaus users have the possibility to add a photo of the observed mammal to their reports. In many of these cases the species identification by reviewing the photograph is possible. Unfortunately the amount of these reports differs with species. For example, 40 % of all reports for the garden dormouse (*Eliomys quercinus*) contain good quality images, this maybe because the animals can sometimes be observed in trees continuously for a relatively long period of time. On the other hand for the common vole (*Microtus arvalis*) we received images in just 28% of the reports. In contrast to the first example, voles mostly can be observed just a few seconds in high grass.

What is the scientific benefit of these reports?

Compared to distribution maps in literature the reports on GeoMaus are easily accessible for all interested people all around the world for free. In addition the data are up to date, so users get actual information. With a reasoned handling and the willingness to interpret low quality reports just as hints (quality over quantity), small mammal observations from amateurs and non-professionals can be an important addition to professional research. Since 2012 GeoMaus documented 828 (613 rodents and 215 shrews, moles and hedgehogs) new occurrences of small mammals in Austria, Germany and Switzerland. These incoming reports can help to improve the knowledge about current species distribution as well as potential changes in known distribution borders. For example with 47 observations the distribution boundary of the striped field vole can be documented with a high accuracy for Germany. Finally, the additional information on the biology of small mammals with interesting texts and photos has the potential to arouse awareness of small mammals and their ecological importance.



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Keywords: citizen science, small mammal observation, Online reports, GeoMaus, kleinsaeuger.at

Conference: Austrian Citizen Science Conference 2016, Lunz am See, Austria, 18 Feb - 19 Feb, 2016. **Presentation Type:** Oral Presentation **Topic:** Citizen Science - Quo vadis?

Citation: Blatt C and Resch S (2016). The scientific value of small mammal observation reports - The project GeoMaus. *Front. Environ. Sci. Conference Abstract: Austrian Citizen Science Conference 2016*. doi: 10.3389/conf.FENV5.2016.01.00004

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