

Change – The transformative power of citizen science

## Co-creation for change: engaging urban community gardeners in the development of insect conservation interventions

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### Abstract

Urban community gardens are socio-ecological spaces, in which the conservation of pollinator diversity in cities can be directly promoted through conservation gardening. However, there is a lack of insights into how practical knowledge of gardeners can be combined with scientific findings in order to develop evidence-based and practice-oriented guidelines for insect conservation interventions. In a co-creation process, we facilitated three workshops with community gardeners from Berlin and discussed research methods and results from four years of ecological research on the relationships between pollinators and garden features. Subsequently, we performed a qualitative content analysis to identify critical adoption barriers and learn from previous experiences of the gardeners. Our preliminary results revealed the gardeners' great interest in understanding the scientific process as well as their high motivation to integrate new information in their own knowledge. Therefore, we think that co-creation has high potential for initiating change as it includes relevant stakeholders at an early stage of the transformation process.

**Keywords:** bees, biodiversity stewardship, citizen science, conservation gardening, qualitative content analysis, social transformation.

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Published by NHM, BOKU and ECSA and peer-reviewed under responsibility of ECSA-ÖCSK-2024 (Change – The transformative power of citizen science)

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## Introduction

Urban gardens are often discussed as a beneficial land use type for pollinators such as wild bees through providing sufficient habitat (Daniels et al. 2020). They are also socio-ecological spaces, in which the conservation of pollinator diversity can be directly promoted through conservation gardening (Segar et al. 2022). However, reliable data and evidence on the effectiveness of conservation interventions is difficult to retrieve and their application in practice is not guaranteed (Drossart and Gérard 2020). Involving key stakeholders like gardeners into the development of conservation strategies for pollinators in the city can be beneficial in that regard (Baldock 2020). By understanding adoption barriers, like social norms that hinder a disorderly looking gardening approach, and gaining insights into successful solution strategies out of the community, conservation interventions can become more relevant for practice (Gusto et al. 2023). However, there is still a lack of appropriate formats and insights into how these perspectives out of the practice can be combined with scientific findings.

Our work aims to close this gap through a co-creation process together with community gardeners in Berlin, Germany. Participation requires a high level of commitment from gardeners, but also harbors great potential for initiating social change (Skaržauskaitė et al. 2021). Here, we will show how we are linking the findings of four years of ecological research on the relationships between pollinators and garden features that we conducted in community gardens in Berlin and Munich, Germany (Neumann et al. 2024) with the practical knowledge of the community gardeners.

## The co-creation process

In order to allow knowledge exchange between researchers and gardeners, we facilitated three workshops at the Museum für Naturkunde Berlin and two community gardens that have participated in our research in Berlin (Figure 1). The sessions took place in October 2023 and lasted each for approximately three hours including two breaks. The actual discussion time during each workshop was 154 minutes, 122 minutes and 115 minutes long. We invited all gardeners from the 16 community gardens that were part of our project in 2023 via email and signs posted in the gardens. We did not offer any financial or material incentives for participation. A total of 33 gardeners ( $n = 10, 13$  and  $10$  for each workshop) out of 12 community gardens in Berlin ( $n = 7, 1$  and  $7$ ) participated. The average age of the participants was 54 years with a wide range of ages, from 18 to 82 years old. The participants were active in community gardens for 1.5 months to 32 years with an average involvement of 6.3 years. Their age was slightly above the average age of the gardeners who responded to a survey in our accompanying research (Sturm et al. 2021), but still represented a variety of community gardeners of different ages and levels of gardening experience.

Each workshop included a presentation of our research methods as well as the discussion of results such as the positive effects of flower richness on solitary bee abundance (Neumann et al. 2024) and their significance for the practical implementation of pollinator-friendly interventions in community gardens. Participants were invited to ask questions, share their thoughts and engage with each other at



**Figure 1.** Example of workshops in which gardeners discussed conservation interventions

any time. Following our aim to co-create new knowledge, we recorded and transcribed the workshops. We conducted a qualitative content analysis by first inductively developing categories based on the research aim, coding of all material and further deductive dividing of the contributions into subcategories (Kuckartz 2012). All coding and development of subcategories was done by two researchers independently. The categories and codes were revised until both were satisfied with the classifications. Based on these results, we will develop a catalogue of guidelines for conservation interventions, which will undergo another feedback loop with gardeners prior to implementing and evaluating pollinator conservation interventions in the gardens.

## **Engaging with science**

Transcribed contributions from the discussions were grouped into three categories: (a) “barriers” to the implementation of interventions, (b) “previous knowledge and experiences” around conservation interventions and (c) “questions and ambiguities”. Here, we briefly present the preliminary results of the latter category as they underline the relevance of linking research and practice in the co-creation process (Table 1).

**Table 1.** “Questions and ambiguities” of participants from workshop 3.

Subcategory	Representative quotes
Reflection on research methods	So, you take them with you and identify them correctly so that you can really say what they are? Because there are almost 400 wild bee species, you can't identify them all in passing.
Further interests	I started to look more into the topic of wild bees and honey bees, whether they are competitors or not at what times or in what area.
Interventions	Yes, but that would also be interesting. So, what types of wood are good and also what age?
Feedback about their own garden and collaboration	So that's why I'm specifically asking if I can have a look at the individual results from the community garden, which I'd be very interested in, of course, in comparison to the other gardens.
Knowledge questions	Are there any nocturnal wild bees?

The participants critically evaluated the research methods and results presented and showed great interest in understanding how we, as scientists, work and reach our conclusions. By reflecting on the results and introducing topics beyond the scope of our ecological research, they tried to connect the new information with their own knowledge and interests. Furthermore, some participants immediately started to plan the implementation of interventions in their own garden. However, it can pose a challenge for researchers to support this high motivation with evidence-based recommendations, as the process of reviewing and publishing scientific findings can be quite lengthy. To synchronize processes, the open question on how to increase the pace of our research while at the same time remaining true to scientific standards needs to be answered.

## Conclusion

Facilitating a co-creation process to develop insect conservation interventions can support reciprocal learning among researchers and gardeners. Gardeners showed great interest in the research and motivation to engage in pollinator conservation, which is consistent with previous research on self-reported motivation to participate in the project (Sturm et al. 2021). We simultaneously gained insights into barriers to the implementation of interventions as well as learned from the participants' knowledge. Therefore, we think that co-creation has high potential for initiating change as it includes relevant stakeholders at an early stage of the transformation process.

## Funding

We thank the Deutsche Postcode Lotterie Stiftung (grant number: FA-8156) and the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) specifically under the Federal Program on Biological Diversity (grant number: 352289415D) for financially supporting this work.

## Competing interests

The authors have declared that no competing interests exist.

## Acknowledgements

We thank the community gardeners for their research and enthusiasm. We are grateful for the support of the teams of the Technical University Berlin, the Technical University Munich and the Museum für Naturkunde Berlin.

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