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Are Collembola flying onto green roofs?

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With a worldwide urban population projected to reach 5 billion by 2030 (Véron, 2007), the roles and benefits of urban green spaces cannot be denied, like climate regulation by trees or water flow regulation (Gómez-Baggethun and Barton, 2013). If green spaces are among the new societal expectations of urban people, they also play a crucial role in preserving biodiversity in urban areas. Among them, green roofs are a great opportunity to create green space in cities as they represent 32% of cities' horizontal surfaces (Frazer, 2005). Their installation is also perceived as a possible way to preserve biodiversity in cities. However, the effectiveness of green roofs in supporting biodiversity, especially soil biodiversity, has rarely been studied.

Thanks to different research programmes (TROL, SEMOIRS and T4P), we investigated the taxonomic and functional collembolan biodiversity in both extensive and productive green roofs as well as in ground-level urban microfarms in order to (i) evaluate the effectiveness of green roofs in supporting soil biodiversity, (ii) identify the mechanisms of colonisation by soil organisms and (iii) separate the effect of landscape and soil conditions on collembolan communities assemblages.

Surprisingly, green roofs are supporting high levels of soil biodiversity. Despite various soil characteristics (organic matter and water avaibility), no difference was found between extensive roofs and rooftop gardens concerning the taxonomical structures of collembolan communities (e.g. species richness, abundances). In contrast, there are differences concerning both taxonomic and functional compositions. Two ways of colonisation are suggested: a passive wind dispersal − the "flying" collembolans − and a settlement through compost inputs. We conclude that stakeholders should take into account the spatial connections of green roofs with other green spaces in order to support urban soil biodiversity.