Two unforeseeable circumstances could justify deviations from the original plan for the year 2022 (second year of the project).

First, despite our hard work and overall successful sampling with a near-complete coverage of the study areas, (our total number of specimens, 4870, exceeded our expectations), we only sampled enough individuals for two species (S. pipiens and M. florea). Indeed, although we caught the other two species (R. campestris and V. pollucens with 45 and 156 individuals, respectively) and we could theoretically run the planned analyses on them, robust and conclusive research analyses would need more data points.

More focused sampling could be thought of as a solution. However, as our teams explored all habitats at different times of day, across the whole sampling period, we are confident that those two species are simply not abundant in urban areas, rather than this being a sampling bias or a lack of collecting skills. Our specialist on Diptera had been confident that we could catch them in sufficient numbers but, alas, this was not the case. This is an unfortunate result, both for its implication about the conservation of those two species in the face of urbanization, and for our project. The literature is lacking about hoverflies as pollinators, and we plan to communicate this result (low abundance of those two species) in another scientific paper, even though we cannot use the data from those species as originally planned.

A second unforeseeable issue that was completely out of our control is that the two species we caught in sufficient numbers are showing low genetic structure. While this does not mean that we cannot analyze the data, the signal of the effect of different landscape features on pollinator movement and connectivity may be weaker, making it harder to identify accurately the relationship between environment and ecological resistance. Alain Frantz and Julian Wittische (postdoc) have previous experience analyzing datasets with low genetic structure and we will use the latest methods to overcome this issue, but it might be that we cannot reach strong conclusions

Both of those unfortunate circumstances point us towards changing the original plan to better fulfil the general objective, which is to better understand the landscape connectivity of pollinators, notably in the face of urbanisation.

To achieve this we believe propose the following three changes to the original plan for 2022:

1. We should not sample R. campestris and V. pollucens in rural study areas. Their low abundance makes it risky because despite focusing on urban areas in 2021, we covered a lot of peri-urban rural habitats and we are doubtful that they will be abundant even in remote rural areas.
2. We should not plan to sample S. pipiens and M. florea in rural study areas. Their low genetic structure in in urbanized study areas, which generally present very fragmented habitats, does not suggest that their structure would be higher in homogenous (relative to anthopogenic distubances) rural landscapes.
3. We should instead focus on 2 new species of pollinators which may give us more chance to detect a stronger genetic structure and lend itself better to fulfil the original objective. We should do so in 2 urban study areas. Choosing a species of another order/family, with different life history traits could be a solution. For this we suggest:
4. Andrena cineraria because many of our staff have experience catching it thanks to another unrelated project, because we already have access to hundreds of adequately stored specimens, and because its life history traits are very different from those of the two species we successfully sampled.
5. As a potential solution, and provided the FNR agrees, we will evaluate the feasibility of using another pollinator species based on the non-target species our teams netted/observed, inventories, citizen science and on the literature.