Short Project Description

Background: Urban green infrastructure provides substantial ecological and sociological benefits to cities and its inhabitants. However, some species within these areas are also highly allergenic (Velasco-Jiménez et al. 2020; Sabariego et al. 2021). This is especially prominent among trees, in which birches (*Betula*) are one of the most allergenic species in Europe while also being widespread both naturally and ornamentally. This can cause significant distress for many sufferers. But birch is not unique in this regard, as many other trees are also allergenic. However, knowledge regarding the distribution of allergenic trees in Norwegian urban areas is severely lacking, both on a national, regional and local level. Recent studies have identified physiological, biological and ecological factors that contribute to allergenic properties within individual tree species, allowing for indexing of problematic species (Cariñanos and Casares-Porcel 2011; Cariñanos et al. 2014). Access to this knowledge would allow municipalities to recommend citizens to avoid certain urban areas during tree flowering times, with significant benefits to public health (Cariñanos et al. 2017; Fernández-Alvarado and Fernández-Rodríguez 2023). It would also allow landscape planners to replace problematic species with more allergy-friendly alternatives.

Aims: We wish to identify the distribution and likely allergenic contribution of trees in a larger urban area (e.g., Bergen, Stavanger or Oslo).

Objectives: I. Prepare remote-sensed source maps of urban tree occurrence. **II.** Conduct botanical field surveys to identify the taxonomy of individual trees. **III.** Classify tree allergenicity and calculate relative allergenicity of urban areas. **IV.** Assist in the manuscript creation and writing process.

Material and Methods: We would use remote-sensed products, such as the SR16 tree dataset to isolate candidates of urban trees, followed by field surveys to botanically classify each individual to species level using taxonomical methods. We would then classify the allergenic contribution of each species and individual tree using recently developed methods. Lastly, the information would be combined to create maps, and areas would be classified from low to high risk according to the distribution and abundance of allergenic trees.

Expected Output: We expect the output to be a peer-reviewed scientific journal article in an international urban landscaping journal of good impact and high readership (e.g., Urban Forestry and Urban Greening or Landscape and Urban Planning).

References:

Cariñanos P, Casares-Porcel M (2011) Urban green zones and related pollen allergy: A review. Some guidelines for designing spaces with low allergy impact. Landsc Urban Plan 101:205–214. https://doi.org/10.1016/j.landurbplan.2011.03.006

Cariñanos P, Casares-Porcel M, Díaz de la Guardia C, et al (2017) Assessing allergenicity in urban parks: A nature-based solution to reduce the impact on public health. Environ Res 155:219–227. https://doi.org/10.1016/j.envres.2017.02.015

Cariñanos P, Casares-Porcel M, Quesada-Rubio J-M (2014) Estimating the allergenic potential of urban green spaces: A case-study in Granada, Spain. Landsc Urban Plan 123:134–144. https://doi.org/10.1016/j.landurbplan.2013.12.009

Fernández-Alvarado JF, Fernández-Rodríguez S (2023) Environmental risk assessment based on the allergenicity of urban green infrastructure: Case study of an urban park. Sustain Cities Soc 94:104532. https://doi.org/10.1016/j.scs.2023.104532

Sabariego S, García-Ventura C, Cariñanos P (2021) Estimating the allergenic potential of urban green areas in the city of Madrid (Spain). Aerobiologia (Bologna) 37:561–573. https://doi.org/10.1007/s10453-021-09705-8

Velasco-Jiménez MJ, Alcázar P, Cariñanos P, Galán C (2020) Allergenicity of the urban green areas in the city of Córdoba (Spain). Urban For Urban Green 49:126600. https://doi.org/10.1016/j.ufug.2020.126600