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The mineralogical interpretation of particulate matter deposited on Agelenidae and Pholcidae spider webs in the city of Wrocław (SW Poland): a preliminary case study

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Abstract:

The main goal of the study was to use SEM-EDX (Scanning Electron Microscope with Energy Dispersive X-Ray Analyser) for chemical and morphological characteristics of geological and trace elements particles identified on different types of webs (belonging to two different families of spiders) at various sampling locations in order to define the possible origin of deposited particulate matter. The research hypothesis assumes that particulate matter deriving from different polluted sites of Wrocław agglomeration affects the structural properties of spider webs and on the basis of its mineralogical interpretation we can define the source of pollution. Spiders belonging to two families: Agelenidae and Pholcidae which are present in urban environment and weave relatively dense but structurally different webs have been chosen for studies as a potential passive bioindicators. Moreover, different time of spider web exposure was tested as a factor influenced final quality and quantity interpretation of data. Samples were collected from three sites in Wrocław city (SW Poland), all traffic-related. Two sites were close to each other with the same exposure time (40-days), the third one was localised in other part of the city and the web was exposed much longer (2-years). Additionally, silk obtained from the laboratory rearing of spiders was also examined (clean laboratory spider web) in relation to contaminated webs. The results reveal that geological and trace elements particles identified on two types of webs at neighbouring sites differ from each other as well as webs exposed to pollutants for longer time as a consequence of structural variation of webs and different exposure time. Pholcidae webs adsorbed larger amounts of particles characterised by smaller diameter. Therefore, these webs are recommended as more perspective tool in contrast to Ageleniids webs which exhibit worse adsorption. The 1-2 month time of exposure of webs is

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