



## Assessment of patches attributes along the Urban Development Gradient

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The world is increasingly urban. If current trends maintain, by 2050 the global urban population is estimated to be 6.3 billion, nearly doubling the world population in 2010. Consequently, more than 60% of the area projected to be urban in 2030 has yet to be built, replacing the open and agriculture lands with construction and infrastructure. The open green patches (OGP), within the urban matrix, are essential for healthy and wellness of cities by supplying the city's ecological services (Mausback and Seybold, 1998). Regarding future trends, there is a need and obligation to insure the functional and sustainability of the city's OGP. Urban vegetation composition and diversity in the OGP had long been considered as an indication for ecologically functioning systems. Furthermore, urban soil is also essential for the sustainability and function of the urban habitat and ecological services, such as maintaining groundwater restraining urban floods etc. (Lehmann and Stahr 2007). There is no single set of rules to classify a functional urban green patch worth preserving.

The aim of this study is to examine the effects of patch properties (including geometry, age, type and location along the urban gradient, connectivity, and urban matrix density) on the presence, abundance and characteristics of vegetation and soil conditions of remnant patches. The inspired purpose is to eventually find an assessment for urban open green patches OGP quality by linking, patches attributes, plants indexes and soil quality indexes.

The research is conducted in the city of Haifa, which is located on the northern part of Mount Carmel in the north-western part of Israel. Mean annual rainfall, 550-800 mm, varies with latitude and the mean temperature is 18.80c. Modern Haifa is a relatively young city which maintains remnant vegetation patches within its municipal boundary. 32 OGP were selected in nine categories (size: small, medium and large, distance from city edge: far, average, near), in which vegetation was surveyed. All vascular plant species were recorded and identified. The mineral soils (A horizon, depth 10-15 cm) were collected to obtain a constant sample size after removing surface litter and organic matter. The samples were analyzed for mineral and structure properties.

Preliminary results of the plant survey and analysis indicated that the patches' vegetation is highly diverse. Within the large patches, regardless of their location along the urban development gradient, higher sub-habitat diversity and plants diversity were observed. The diversity is high for local and exotic species alike. In the medium and small size patches, also regardless of their location, there is a diversity of plant composition that may be connected to different disturbances or matrix related effect not yet considered in the study. Preliminary results of the soil survey and analysis indicated that more than 75% of the soil samples taken from the OGP, regardless of their location in the urban development gradient, exhibited a considerable changes in soil profile, compared to "natural" soils and significant alternations in the physical properties were also observed. The substance that was found in the remnant OGP in Haifa is different from soil, however, links between the urban-soils altered properties and the vegetation composition in those patches, and there relationships are not fully understood.