

| Oriol García Antúnez | Biologia Ambiental, 2018 |

1. BACKGROUND: Particulate Matter (PM) and Green Roofs

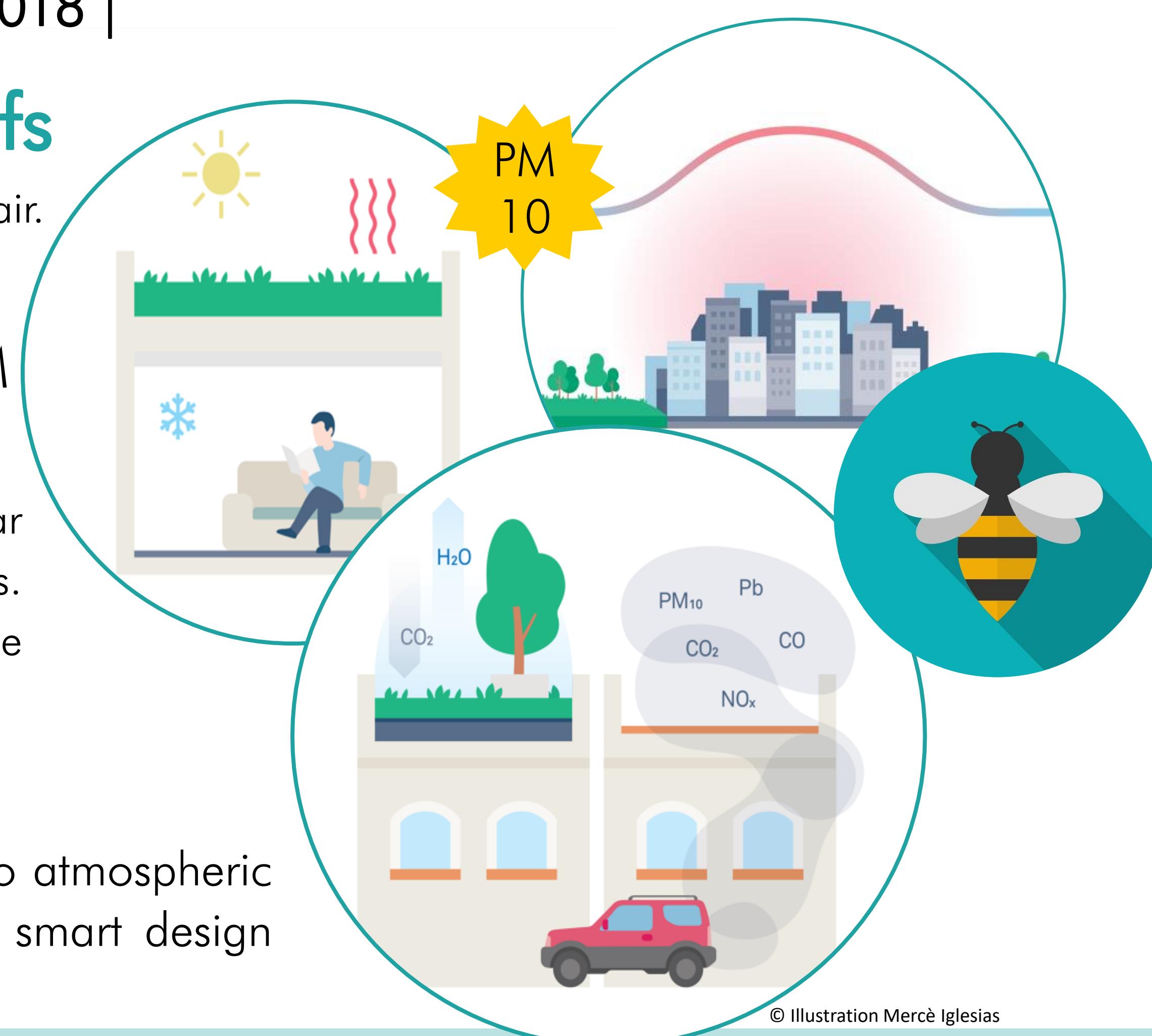
Particulate matter (PM) is a mixture of both solid and liquid compounds that can be found suspended in the air. PM 2.5 ($>2.5 \mu\text{m}$) is the most hazardous portion as it can penetrate to the gas-exchange region of the lung.

"Respiratory diseases and dysfunctions are the main concern to the increasing PM concentration in dense cities"

Micro and macro morphological characteristics of vegetation like roughness, epidemical and cuticular features, and leaf arrangement design are key factors that determine their potential as PM retention surfaces. However, weather conditions like precipitation and wind speed can remove a 48% to up a 36% of the retained PM on leaf surface of urban vegetation.

"Up to 50% of the impervious city surface is rooftops"

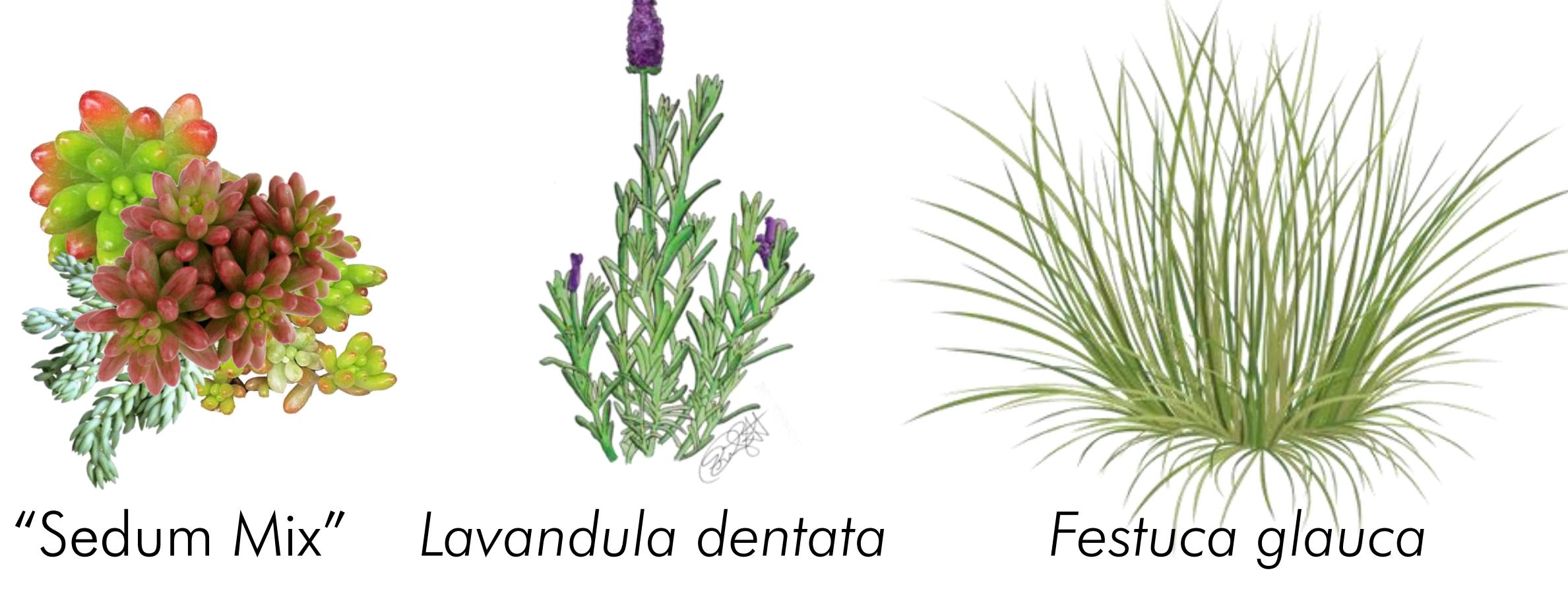
By making use of this unexploited space, non-cultivable surface in cities would be transformed into atmospheric PM sinks. **Green roofs (GR)**, with all their benefits to human and environmental health, are a smart design solution to use up this forgotten urban space.



3. HYPOTHESES

"**Grasses**, with their parallel grooves and blade-like macro morphology, together with **hairy** leaf species, will presumably retain higher amounts of atmospheric PM. A loss of PM is expected to be found after **rainy and windy events**, being of a higher or lesser importance depending on leaf **wax** content and leaf **micro and morphological characteristics**."

4. MATERIALS AND METHODS

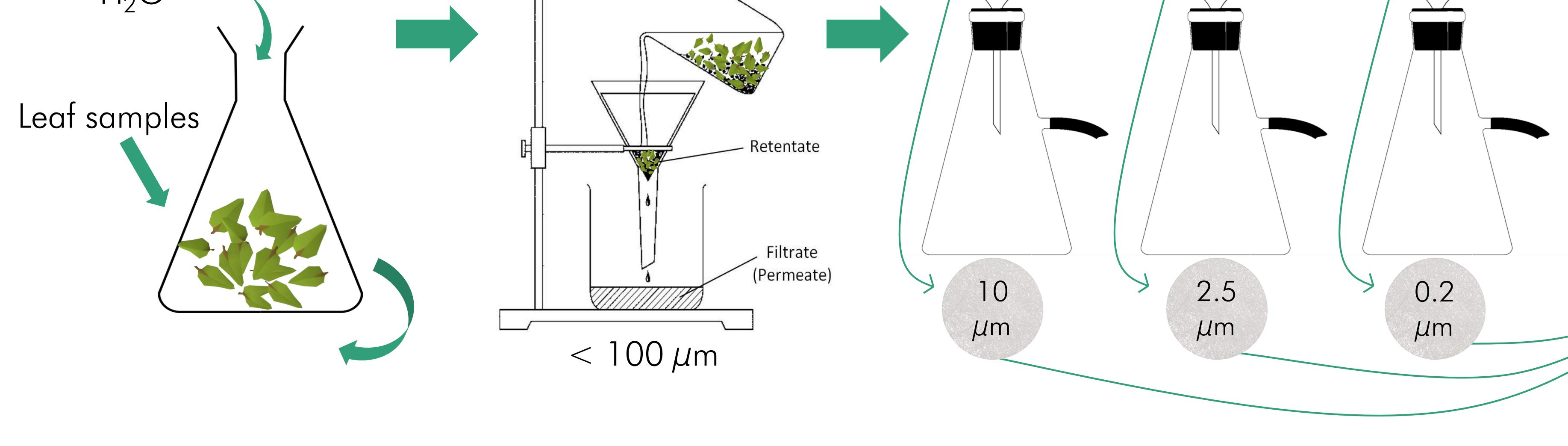


"Sedum Mix" Lavandula dentata

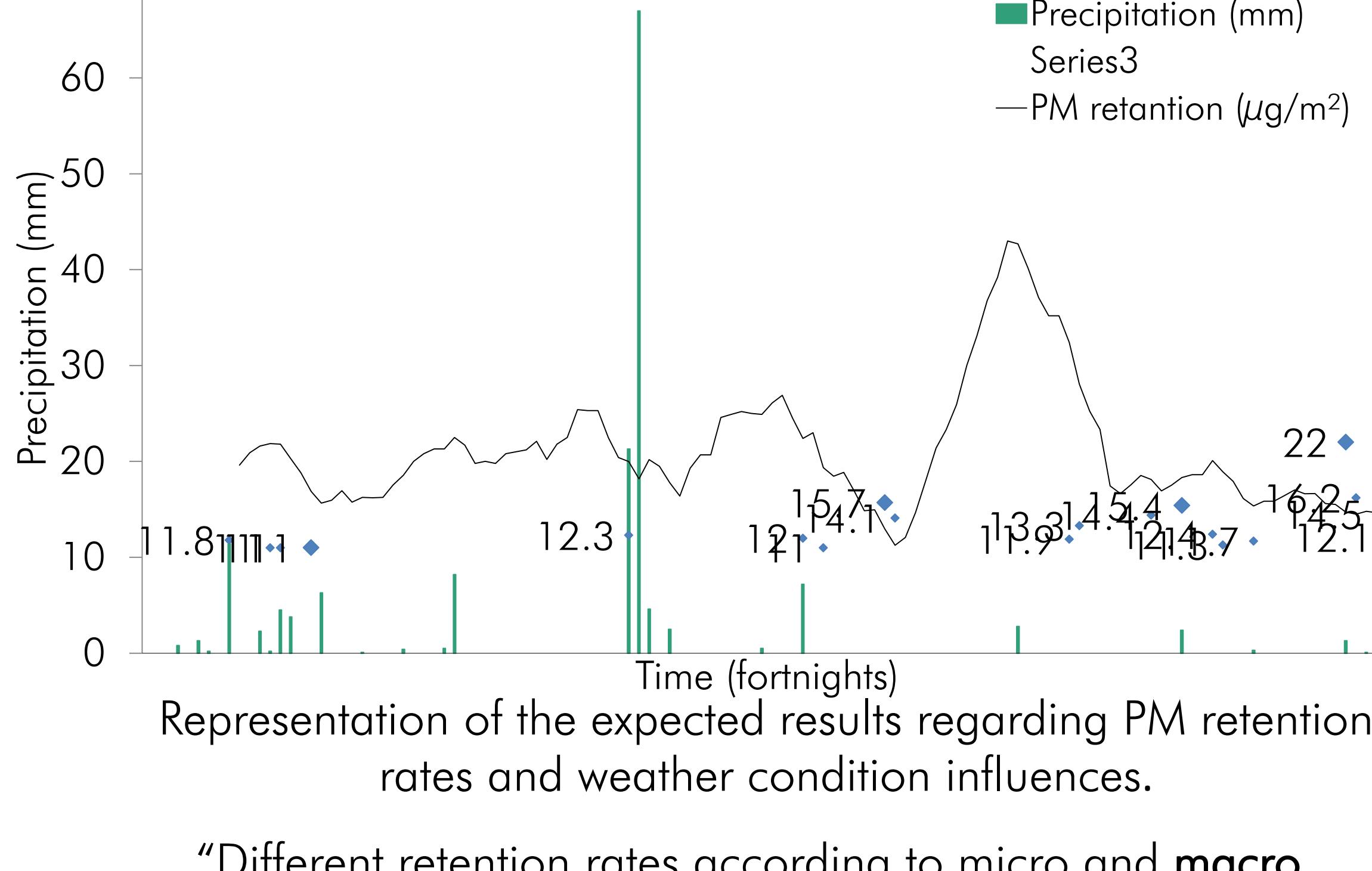
Coberta Experimental
Mercè Rodoreda (MR)
Barcelona, Spain



PM quantification



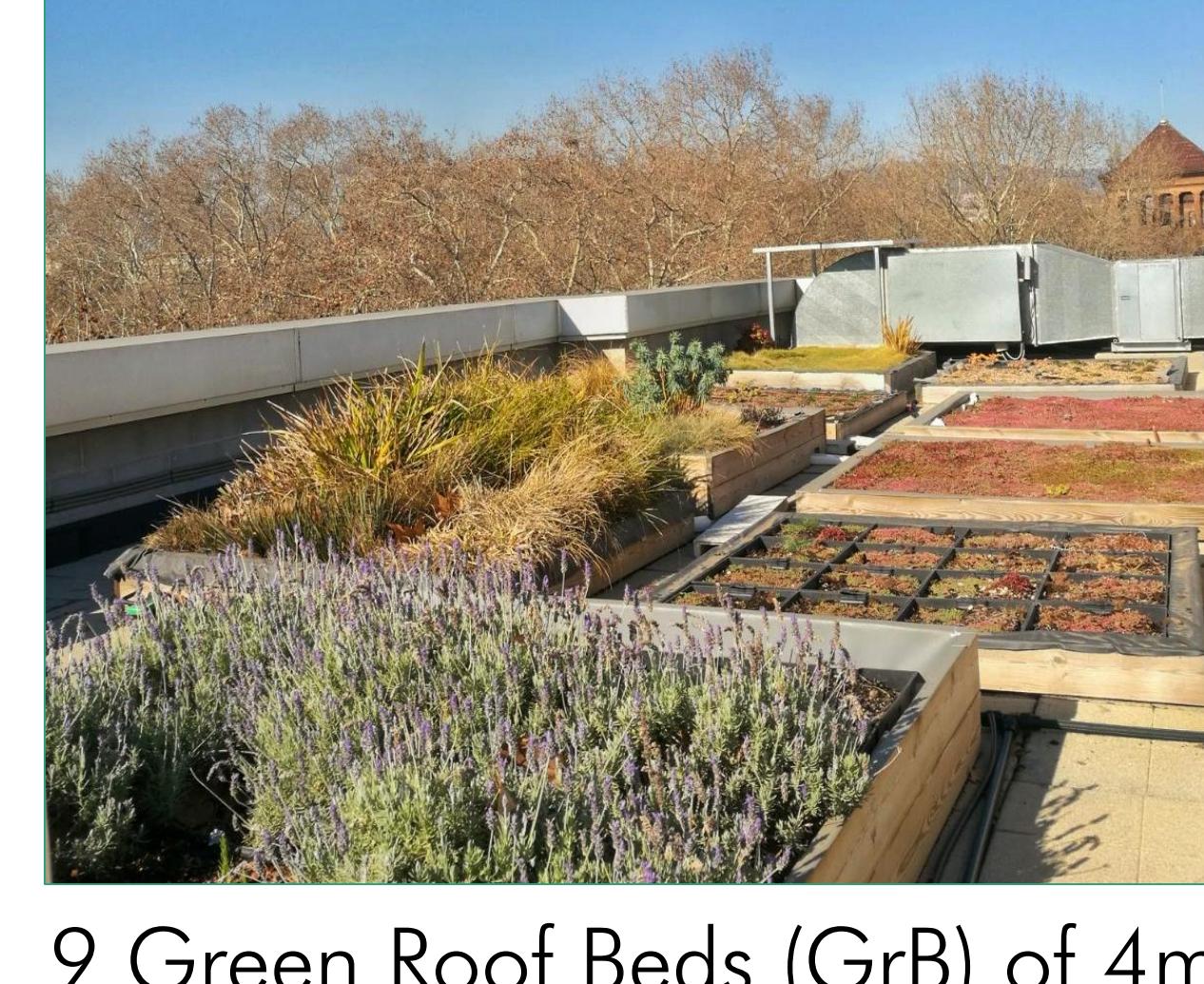
5. EXPECTED RESULTS



"Different retention rates according to micro and macro morphological characteristics of selected species"

2. OBJECTIVES

"Experimental quantification of PM accumulation on Mediterranean GR species and assessment of the effects of wind and rain on PM deposition rates on plant leaves."



9 Green Roof Beds (GrB) of 4m² + Weather Station



Retained PM estimation:

$$W_1 - W_2 = \text{PM}$$

Where W_1 : post-filtration weight, W_2 : pre-filtration weight and PM: total retained PM

3 fractions of PM will be obtained

- GrB LAI measurements
- Statistical analysis

6. TIME TABLE

Year 1												Year 2											
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
GrB installation												Leaf sampling period											
PM quantification analysis												Data analysis and Preliminary results											

TOTAL
59.000€

Equipment
(GrB, Weather
Station)
7.200€

Materials
(PM
analysis)
3.200€

Personnel
expenses
43.200€

Travel
expenses
5.400€

