Maintenance of extensive green roofs in Sweden: achieving long term ecological and visual performance


Green roofs turn grey infrastructure green

Green roofs are a way to renew urban areas and to include valuable ecosystem functions even in dense urban areas. Green roofs can be seen as a nature based solution for some of the problems that urban areas are facing, both due to climate changes and urbanisation.

The story of extensive green roofs in Malmö – Local recycling centers

Malmö has been the driving city for green roof installation in Scandinavia. The city has been running several projects together with NGOs and public companies e.g. the Enevret Augustenborg, Ibo1 and the Augustenborg botanical roof garden (www.greenroof.se). There has also been a tremendous installation of small local recycling centers covered with green roofs. The municipal housing company has installed more than 100 of these small and lightweight buildings during the last 15-20 years. The buildings are often small in size (approx. 500m²). The roofs that are installed are often thin. They could be defined as extensive green roofs, with 3-4cm of substrate, succulent vegetation and no maintenance.

Development on small extensive green roofs

The green roofs have been surveyed in 2006, 2014 and 2015. The roofs were visually inspected at each inventory. They were then classified in 4 quality classes with 0 being the lowest needing urgent renovation or replacement and 3 indicating perfect condition. The development was documented using digital images.

There is a general decay of green roof status over time if no maintenance is applied. There is a decrease in vascular plant cover and standing biomass. In general, there is an increase in bryophyte cover on unfertilized roofs. This adds to the cover of the surface and prevents erosion but can also be problematic from a maintenance perspective as birds dig in the moss layer that ends up clogging the roof drainage.

Fertilization trial

Green roof maintenance for simple extensive green roofs is often focused on fertilization. It has been previously shown that these levels of fertilizer can be used without harming the stormwater runoff. In addition, the runoff water from most of these roofs was directed to a vegetated grass strips or perennial plantations further reducing the risk. The application of both the mid and especially the high fertilizer rate greatly increased plant cover and flowering.

Every part of the process is important to achieve quality

A green roof is only successful if every step from idea, design, material selection, installation, handover and the following maintenance is done with knowledge and quality. During the development of the project, the explicit goal of the installation is not always known. Thus, it is not always clear which ecosystem functions that are supposed to be delivered from the installation.

Conclusion

The extensive green roofs are installed for having low maintenance requirement but are not maintenance free. These very thin extensive roofs do not go through any larger successional process. The thin and permeable nature of the substrate layer means a constant loss of nutrients and a decay of the vegetation. If the green roofs are not maintained, these extensive green roofs will not deliver their expected ecosystem services.

Project description and funding:

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The purpose of the project concerns research and development towards more sustainable cities in Sweden by the implementation of successfully constructed and maintained green roofs. The project is planned for 4 years, 2006-2010.

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Affiliations: