Urban ecosystems are the most complex mosaics of vegetative land cover that can be found (Colding, 2007). Recently, Goddard et al. (2009) have shown that, to maximise the potential of urban environments, private gardens should not be managed simply in isolation but as connected units. We agree strongly with the idea that gardens can form interconnected patches that can be managed within an urban network of green infrastructure. As Colding (2007) argued in his paper, key consideration in all production landscapes is heterogeneity in the type and intensities of land-use. In light of these considerations, ecological land-use complementation (Colding, 2007), that is, the clustering together of a whole range of different patches of vegetative cover, should be applied in cities to increase available habitat and promote ecological processes. At present, it remains to be established whether green roofs, which are becoming increasingly common in cities, constitute an important element in such urban networks.

In a recent review in the Journal of Environmental Management (vol. 92, pp. 1429–1437), Francis and Lorimer (2011) evaluated the reconciliation potential of living roofs and walls. For these authors, these two techniques for habitat improvement have strong potential for urban reconciliation ecology. However, they have some ecological and societal limitations such as the physical extreme environmental characteristics, the monetary investment and the cultural perceptions of urban nature. We are interested in their results and support their conclusions. However, for a considerable time, green roofs have been designed to provide urban greenery for buildings and the green roof market has only focused on extensive roof at a restricted scale within cities. Thus, we have strong doubts about the relevance of their use as possible integrated elements of the network. Furthermore, without dynamic progress in research and the implementation of well-thought-out policies, what will be the real capital gain from green roofs with respect to land-use complementation in cities? If we agree with Francis and Lorimer (2011) considering that urban reconciliation ecology between nature and citizens is a current major challenge, then “adaptive collaborative management” is a fundamental requirement.

© 2012 Elsevier Ltd. All rights reserved.
infrastructure. Rooftops can represent up to 32% of the built area of a city (Gedge and Kadas, 2005). Previously, green roofs were built for aesthetic and leisure purposes. Nowadays, they are used for practical purposes, especially for managing rainfall and reducing energy consumption (Goddard et al., 2009).

Many studies have demonstrated that green roofs can retain rainfall, but the quantity retained depends on many variables, such as substrate depth, type of vegetation and duration and intensity of precipitation. This variation prevents generalizations being made about the efficiency of green roofs in this respect (Carter and Fowler, 2008). This is also the case in terms of the effects of green roofs on the energy consumption of buildings. The effects of such roofs on energy consumption are influenced by the type of vegetation used, climate, and the type of building, and cannot be generalized (Czemiel Berndtsson et al., 2009). This variation leads to difficulties in standardizing the technical characteristics of green roofs, which also causes problems in determining the benefits of the services that they provide. Even with regard to biodiversity, there is much heterogeneity in terms of results. Depending on the characteristics of the geographical location, local native vegetation may not tolerate the environmental conditions on a green roof, which may affect the number of species that can become established on it (Fioretti et al., 2010). Although demand for green roofs and related products is expected to increase, it is extremely important to overcome the current limitations of these products and extend their future possibilities by research programs and the implementation of appropriate policies.

In conclusion, we agree with Francis and Lorimer (2011) to say that both heterogeneous designs and a landscape-scale approach may serve to maximise the potential of green roofs to promote biodiversity. However, the green roof industry is currently focused only on technologies that expand the market for new restorative building designs. Therefore, how can the integration of urban green spaces be optimised given this limited objective, which is focused on individual buildings? Could the use of extensive roofs, which are the most popular type, promote the formation of a network of interconnected patches? Furthermore, without dynamic progress in research and the implementation of well-thought-out policies, what will be the real capital gain from green roofs with respect to land-use complementation in cities? Finally, if we agree with Francis and Lorimer (2011) that urban reconciliation ecology between nature and citizens is now a major challenge, then “adaptive collaborative management” (Stewart et al., 2004) will be a fundamental requirement to make this possible. Such collaboration, involving partnerships between citizens, ecologists, industry, urban designers and architects will enable appropriate consideration of new urban ecosystems and their potential use within urban networks.

Acknowledgements

The authors would like to thank the ParisTech Chair in “Eco-design of buildings and infrastructure” (www.chaire-ecoconception.org), which funds the doctoral research of Alexandre Henry.

References


