

## FIELD NOTES

# Back to Nature

## *An Alternative Approach to Planting Green Roofs*

by HAVEN KIERS

IF THE PHRASE “GREEN ROOF TECHNOLOGY” CALLS TO MIND ICE CUBE-LIKE TRAYS sandwiched between layers of plastic sheeting and synthetic fibrous mats topped with highly engineered growing medium, and a pre-grown sedum carpet you’re not alone. This is an apt description of most American green roofs and the economic backbone of the contemporary green roof industry. So this past summer when several Bay Area living architecture specialists were invited to travel and learn about green roof planting and policy in Switzerland, we thought we knew what to expect.

Instead, we were introduced to the polar opposite of what we had anticipated. There were no systems, no plastic trays, no manufactured “moisture retention layers,” or synthetic filter fabrics. The Swiss green roofs that we toured employed a simple layering of straw, or China reed (*Miscanthus sinensis*), topped with native soil from the site (sometimes mixed with lava rock or gravel), and planted with a wildflower seed mixture. That’s it.

And these green roofs were spectacular! They were nothing like the sedum-covered extensive roofs that look so much alike you can’t tell whether they’re from Boston



The prolific green roofs of Switzerland’s major cities meld even their most industrial edges with the surrounding landscape. Photo: Jeff Joslin



**CLOCKWISE FROM UPPER LEFT:** Logs and stones provide habitat niches for fauna; planting on Zurich's Sihlcity shopping mall roof; agricultural green roofs, like this one in Mohlin, provide additional area for crops and grazing; a simple overflow system ensures drainage and water transfer between planted roof areas at the Sihlcity shopping mall. *Photos: Lisa Lee Benjamin (top left) and Jeff Joslin*

or Berkeley. One 100-year-old roof boasted 175 different species of flora, including 10 species of endangered orchids native to the wet meadow regions of Switzerland. Another provided habitat for ground-nesting lapwings, a native bird population that has been decimated by foxes and urban growth at ground level. And still others provided pollinator plants for local bees and butterflies. The roofs were literally teeming with wildlife—from the tiniest spiders hidden in a nook of a rotten log to the sheep grazing on top of a small family farm building.

Swiss policy dictates that most new construction must include green roofs. What is interesting is that the motivation for requiring green roofs in Switzerland

has very little to do with energy savings, reduction of the urban heat island effect, or extending the life of the roof membrane. Instead, the main driver is promoting biodiversity—typically an afterthought on North American green roof projects. The Swiss understand the benefits of creating a lasting ecology on the roof by providing habitat for the plants and animals that will make it thrive. Through basic principles of soil science and horticulture, they are employing effective technologies that allow roofs to develop their own ecosystems over time.

### Here are a few of the lessons we brought back with us:

#### **A green roof doesn't need to have an expensive "system" in order to work effectively.**

Swiss green roofs cost significantly less than their American counterparts, primarily because they don't rely on manufactured systems that require you to purchase a variety of components regardless of the roof's particular needs. None of the sites we visited used a plastic system to artificially create the layers of a green roof, and all them functioned perfectly well without it—including ones that had been around for over 100 years. The roofs we saw were neither flashy nor expensive. Instead, they incorporated straw or gravel for drainage—materials that are readily available, cheap, and work better to create a sustainable ecosystem on the roof.

#### **Local substrates are far more effective at creating healthy ecosystems than engineered soils.**

Integrating displaced soil from the site as a part of a roof's substrate helps recreate previously existing habitat. Native soils can then be mixed with sand, lava rock, or loam in order to meet specific ecological needs on the roof. Lightweight, engineered soils create sterile, harsh environments for microorganisms and insects.



This project for a roofing company in Sins, Switzerland, is integrated with ponds, hydroponics, and solar technology, demonstrating the flexibility and potential synchronicity of such systems. *Photo: Jeff Joslin*

#### **Plant roofs with perennial and annual seeds and ephemerals that will thrive in the local climate.**

We need to start observing our local ecologies and landscapes and incorporating these plant palettes into our roofs. It is not necessary to install pre-grown green roof plants. We can take the time to plant some seeds and see what works and what doesn't. The Swiss are patient. They are willing to wait for a finished product and are not nearly as addicted to the principles of instant gratification as we Americans are. We need to be willing to experiment and go beyond both the "natives only" and "sedum mat" dominating dogmas.

#### **Green roofs don't have to be green.**

If biodiversity is your main driver, plant coverage is not always the most important component of a green roof. Open substrates provide habitat for nesting bees and other insects and can vary in height and depth. Branches, logs, and rocks can provide visual interest while simultaneously improving habitat value on the roof with annual seeds providing short bursts of seasonal color.

#### **There is nothing to be afraid of.**

The North American green roof industry is built on fear. Fear that the roof will leak and the building will collapse. Fear that the plants will die. Fear that the green roof will cost too much money. The greater the fear, the more "mitigating" products can be sold. If we just trust our informed instincts, we'll be so much better off. The reality is that as long as you have a solid underlying structure and a competent roof membrane, the rest doesn't need to be complicated. Don't let a "what if" distract you from the "what can be."

*Haven Kiers specializes in green roof design and has spent nearly 10 years teaching students about green roofs and other green infrastructure.*