HÜGELKULTUR:

WHAT IS IT, AND SHOULD IT BE USED IN HOME GARDENS? (HOME GARDEN SERIES)

Hügelkultur is an increasingly popular way of using organic material to create mounded home gardens and landscapes. This method is often taught to gardeners in permaculture and biodynamics workshops. But is the enthusiasm for this method supported by scientific research? This publication describes how to create a Hügelkultur bed, how Hügelkultur originated, and the state of the science behind the practice. It concludes with some science-based alternatives for using woody debris in gardens and landscapes.

What Is Hügelkultur?

Hügelkultur is a German term meaning hillock or mound cultivation. It is a method of building garden and landscape beds using woody material, garden debris, and soil arranged in long, tunnel-shaped mounds. Since these beds are three-dimensional, they create additional space for growing plants.

Creating a Hügelkultur Bed

There are many instructions available online detailing Hügelkultur bed construction. The earliest known are those published in a German booklet (Beba and Andrä, n.d.) that was translated for use in this publication. The instructions that follow are taken directly from this translation.

First, a rectangular depression is constructed by removing sod; woody debris such as branches and deadfall is laid out along the center line at a height of two feet from end to end (Figure 1). Material is tapered to the ground along the sides. More woody debris, vegetation, and the original sod is added to the top and sides of the mound. Soil is added as well, and the entire mound is beaten with a shovel to create a smooth surface. More dead foliage is added, along with soil, composted animal manure, and worms. Coarse compost and soil are added and the mound is beaten into the desired form.

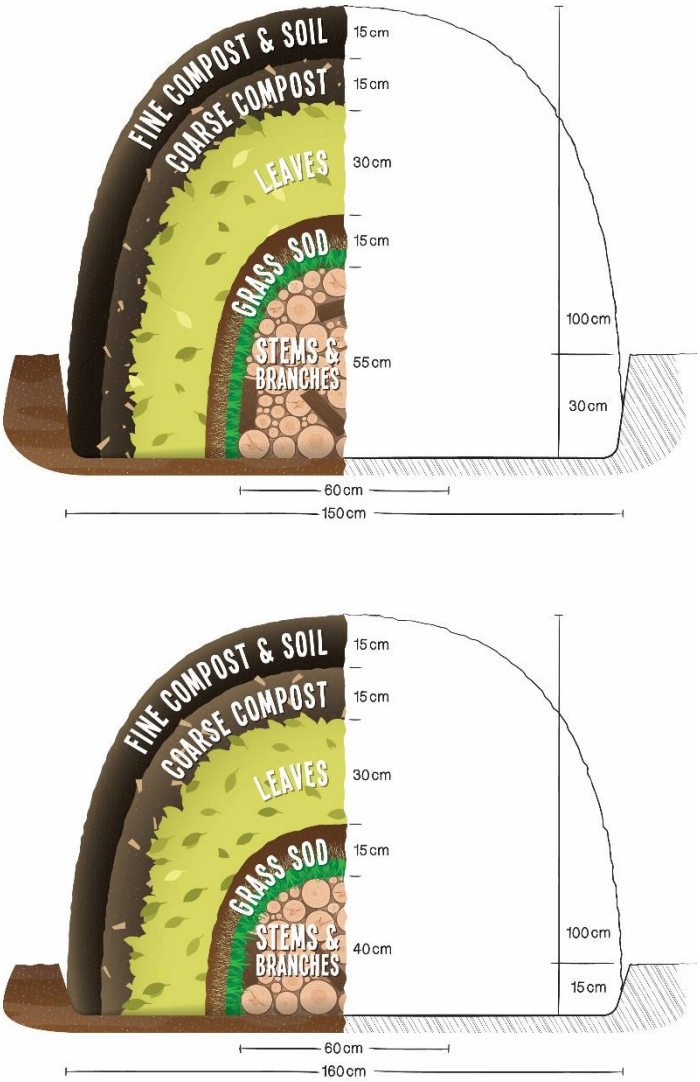

Figure 1. Schematic of Hügelkultur mound construction; 30 cm = 1 ft. (Adapted by Andrew Mack from Beba and Andrä, n.d.)

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The mound is left to rest over several months, during which it decomposes and settles from its original three foot height to something more appropriate for a garden bed. Planting, watering, weeding, and fertilizing instructions are detailed. The reader is cautioned, however, that mounds have a lifespan of five to six years, after which they need to be "rebuilt from scratch." This is an important point that will be revisited below.

How Did Hügelkultur Originate?

Popular publications provide a murky story on the origins of Hügelkultur. It has been described as "a centuries old…technique" (Adams 2013) as well as a permaculture method developed in 1978 (Laffoon 2016). In fact, the term first appears in a 1962 German brochure written by avid gardener Herrman Andrä. In this brochure, Andrä describes the diversity of plants found growing in the woody debris pile in the corner of his grandmother's garden. This observation inspired him to promote mound culture, or Hügelkultur, as an alternative to "flatland culture." This method was also a useful way to dispose of woody debris, the burning of which was prohibited.

While the term Hügelkultur is not in print before 1962, Andrä's methods may have been influenced by fellow countryman Rudolf Steiner. For instance, Andrä included this quote from a 1924 Steiner lecture on biodynamics in his booklet:

> "Therefore, you will have an easier time of mixing regular inorganic earth with composting substance or with any kind of material that is in the process of decaying, if you are building earthen hillocks and permeate them with it. Then the earth itself will have the tendency to come inwardly alive and become akin to the vegetative."

Andrä's original booklet was revised and reprinted several times through the 1970s and 1980s (Figure 2) in collaboration with Hans Beba, another German gardener and follower of Steiner. (The text translated for this publication was the 10th edition; no publication date was given.) These booklets are difficult to find, and they have never been officially translated to English.

The Science behind Hügelkultur

There are no peer-reviewed, scientific studies on Hügelkultur. A few university students have conducted projects (Adams 2013; Hazan et al. 2021a, 2021b; Laffoon 2016), but these have not been published in scientific journals. Thus, gardeners rely on popular books and websites for Hügelkultur information. In this section, we will review the evidence for Hügelkultur methods.

Figure 2. The original German booklet published by Andrä and Beba. This copy was obtained through an international bookseller.

Scientific Principles

Both Andrä and Beba promoted Hügelkultur as a "method based on biological principles." It is unclear, however, what these biological principles are. None are described in the brochure and there are no references. In fact, this method is at odds with the ecological principles behind soil building through litterfall. The guiding principles appear to be derived from the authors' personal observations and Rudolf Steiner's biodynamics lectures (which can be found online). The science behind the biodynamics approach has been previously reviewed (Chalker-Scott 2013).

Excessive Use of Rich Organic Material

The authors seem unaware that nutrient-rich organic matter can be overused. Directions for building Hügelkultur mounds include the addition of a foot of dead leaves, a few inches of composted manure, and three to four inches of compost (Beba and Andrä, n.d.). Decomposing organic material can release excessive nutrients, contaminating soil and water habitats. This is why commercial compost piles are managed on concrete pads with contained drainage (Harrison et al. 2005).

Practicality of Mound Structures

The mounding process can create other problems. Weeds are acknowledged as a significant problem and colonize mounds rapidly unless mulch is used. Over time, the mounds will collapse as woody material breaks down and beds must be rebuilt as mentioned earlier. This structural instability cautions against "planting fruit trees and bushes in them" as recommended (Beba and Andrä, n.d.).

Avoiding Contaminated Soil

Mounding is recommended by Beba and Andrä for creating gardens on top of "poisoned layers" of soil. Unfortunately, there is no barrier between the underlying soil and the mounds built on top of them. It is true that soil contamination from heavy metals or other pollutants can be a problem for some home gardens. In such cases, building traditional raised beds with soil barriers is the only reliable method of avoiding underlying contaminated soil (Binns et al. 2004; Cogger 2017).

Food Security

The rationale behind Hügelkultur is that a mound structure would produce more food than a traditional flatland planting. The authors state that a garden the size of 100–200 square meters (equal to 1,076–2,153 square feet) would allow a single family to be self-sufficient. However, 2,200 square feet is the minimum needed to provide a million calories of food per year (Haspel 2015). Since individuals need nearly one million calories per year to survive, it is unlikely that even the largest Hügelkultur bed would be sufficient for a small family.

Gardeners may enjoy experimenting with mound gardens, so a more practical approach is to utilize raised bed garden principles which are backed by peer-reviewed research. Try gardening with soil mounds (also called unframed raised beds; Miles 2013) and cover them with appropriate layers of compost and woody mulch to prevent soil erosion. This system is sustainable as the soil will not collapse the way woody debris mounds will. Compare these mounds to a traditional "flatland" method to see if yields are different.

Science-Based Uses for Woody Material in Gardens and Landscapes

Woody organic matter is crucial for any landscape that has trees, shrubs, and other perennials. Woody debris provides a slow release of nutrients for plants. It is also a food source for beneficial microbes and habitat for beneficial insects. It is important to use woody material in ways that optimize these benefits; at this point, there is no science-based evidence that Hügelkultur is such a method. For most landscapes and gardens, woody material can be used to its best advantage on the soil surface where it would occur naturally.

Mulches are an easy and inexpensive means of using smaller pieces of woody debris, such as arborist wood chips (Chalker-Scott 2021). Larger pieces of woody debris, including branches and deadfall, can also be used as shelter or nurse logs (Figure 3) for smaller plants. Or they can be used to create a frame for a raised bed, terraces along slopes, or along a landscape path (Figure 4). By preventing compaction and erosion, and by providing adequate nutrition, woody material used as a mulch contributes to sustainable soil building.

Figure 3. "Nurse" log used in a parking strip garden. Photo by Linda Chalker-Scott.

Figure 4. Deadfall branches can be used in public and residential landscapes to encourage people to stay on pathways. Photo by Linda Chalker-Scott.

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Additional Resources

Good, D. How Big a Garden Will Your Family Need? http://theprepperproject.com/how-big-a-garden-will-your-family-need/. This blog post describes some of the practical details to be considered in creating a self-sufficient vegetable garden.

Rudolf Steiner Archive and e.Library. http://www.rsarchive.org/Biodynamics/.

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