

# What is a fairy circle?

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**Figure 1.1:** Grassland with numerous fairy circles merges with sparse Mopane woodland in front of the Otjihipa Mountains at the eastern margin of the Marienfluss Valley in the north-western Kunene Region of Namibia. This landscape, seen from top of the Featherlion Hill, is just a few thousand metres away from the type locality of the first published photo of fairy circles (Marienfluss Valley, Featherlion Hill, 24.03.2016).





# Chapter 1

## What is a fairy circle?

### Abstract

In Chapter 1 we refer to the first published photo of fairy circles. At this type locality, the fairy circles are inhabited by sand termite colonies of the genus *Psammotermes* that kill the grass within the bare patch by localized herbivory

at the roots. The soil is formed by unconsolidated permeable sand. In this chapter we also discuss other terms that are used to describe fairy circles and similar structures.



# 1 What is a fairy circle?

Until 1971—now more than 50 years ago—the fairy circles were simply perceived as insignificant bare areas on the edge of the Namib Desert, in which no one was interested. Still today, anyone who asks Himba in the Marienfluss Valley in Namibia or in the Iona National Park in Angola about the fairy circles usually receives a shrug of the shoulders: the bare areas have always been there; they are part of the landscape and are clean places where you can easily build a kraal for young stock: there is nothing more to say. A similar situation is found in the Richtersveld where the pastoralists have no stories to tell about fairy circles. If in the Namib Desert a traditional knowledge, similar to the “dreamings” of termite pavements by Australian Aboriginal people, ever existed it was mostly lost during history (for more details see also Chapter 4).

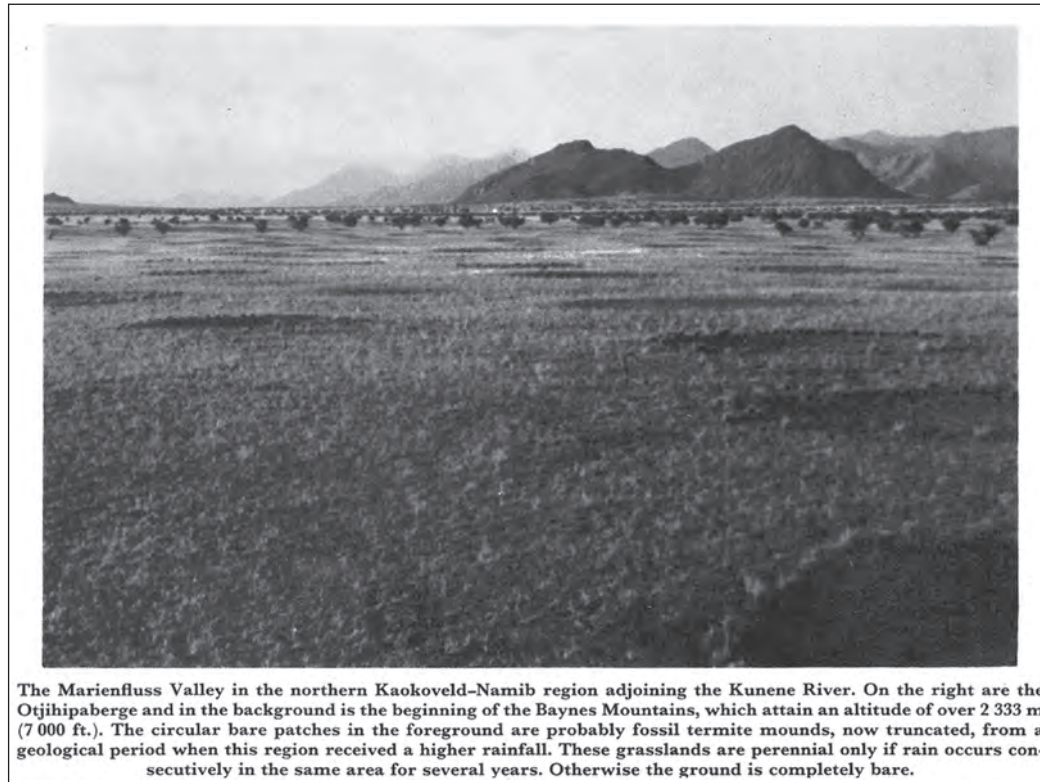
Nowadays, “fairy circles” or “fairy rings” are well known terms in Namibia and everybody associates these terms with the bare areas in the grassland at the eastern edge of the Namib that are often surrounded by one or sometimes several rings of lush vegetation. Whereas the emphasis of the term “fairy circle” is on the circular bare area, the emphasis of the term “fairy ring” is on the lush and tall ring of grasses growing up around the bare area. The term “fairy circle” has received substantial attention by the mainstream media in recent years; as a result, the meaning of the term has been greatly expanded and applied to potentially analogous or homologous structures.

If we follow the “type principle” often applied for organisms in biology, according to which the first mention is decisive for e.g. a species name, the fairy circles of the Namib were first illustrated in the literature by Ken Tinley in 1971 in an article on conservation in the Kaokoveld. A photograph (Fig. 1.1) taken from the center of the Marienfluss Valley facing north shows several dozen fairy circles. In the caption, these “circular bare areas” are interpreted as remnants of fossil termite mounds that have since been flattened. A recent visit (20.05.2022, see Figure 1.2) of the site where Tinley took the photograph confirmed that these fairy circles are inhabited by sand termites of the genus *Pсамmotermes*.

However, neither Tinley (1971) nor the subsequent authors Theron (1979) or Eicker et al. (1982) used the term “fairy circle” or “fairy ring”. Moll (1994) was the first who reported that the term “fairy rings” was used locally in Namibia. All these early works referred to bare patches in the Marienfluss Valley or Giribesvlakte. Therefore, there is an objective logic to using the northwest of Namibia (the Kunene region, Kaokoveld), and more specifically, the Marienfluss Valley, as the type locality for the “fairy rings”.

Without such definitions, the term would become arbitrarily usable, for there are numerous phenomena worldwide where vegetation is circularly absent, lower in abundance, or otherwise altered: “fairy rings” in grasslands and lawns caused by fungi are known from all humid regions of the world (see Chapter 8). More or less circular bare areas occur worldwide in connection with the burrows of numerous organisms (termites, ants, and soil-burrowing small mammals) or are caused by soil dynamics (pedoturbation, salt polygons, or frost patterns), vegetation dynamics (competition, seedbank patterns) or disturbances, which inhibit plant growth (petrol, dung, urine, poisonous or allelopathic substances, carcasses etc.). Here terms like “disc”, “ring” and “arena,” but also “fairy ring” or “fairy circle” are used.

Recently, regular bare patches in the vegetation of Australian drylands were incorrectly presented as a new discovery of fairy circles (Getzin et al. 2016). These bare patches were named “fairy circles” even though they do not occur in a desert environment with approximately 100 mm of annual precipitation, as do the Namib Fairy Circles, but instead are found in a much wetter climate with a mean annual precipitation of 327 mm (for comparison: Windhoek receives 370 mm/y). In addition, the soil of the bare patches in Australia is not formed by loose sands that allow rapid infiltration of rainwater, but by soils sealed by a high content of clay and silt. Because of these strong and functionally important differences, the bare patches in Australia present a different phenomenon and, therefore, require a different name to distinguish them from the fairy circles described in the Namib Desert. Otherwise, it would be just as possible to list the *Macrotermes* termittaria, which occur frequently in the savannas of



**Figure 1.2:**  
The first historical mention and illustration of the fairy circles of the Namib by Tinley (1971).



**Figure 1.3:**  
The same landscape 51 years later, at 20.05.2022. The fairy circles in the foreground contain sand termite workers, soldiers, soil dumps, galleries and nests (Marienfluss, Plot 38154, 17.649 S, 12.645 E, 20.05.2022).

southern Africa and leads to sealing of the soil surface, or the heuweltjies (see Chapter 10.1) as “fairy circles.” In 2017, “Fairy circle landscapes under the sea” were referenced by Ruiz-Renes et al. (2017). Myagkiy et al. (2020) used the term “fairy circle” to refer to vegetation-free gaps of several hundred meters in diameter in forests in Brazil, the US and Oman, which were caused by natural gas blowouts above large reservoirs, particularly of hydrogen, that killed the vegetation. In 2019, the term fairy circle was even borrowed for carbon-based nanostructures in the article “Graphite and graphene fairy circles” (Phan et al. 2019). Most of these structures and the proposal by Getzin et al. (2021) to exclude termites

from the definition will not be considered further in this book. However, several patterns with features or processes similar to Namib Fairy Circles will be discussed in Chapters 9 and 10 in order to distinguish both, the similarities and the differences. The frequent application of the attractive term “fairy circle” to various similar or analogous structures makes it necessary to use the term “Namib Fairy Circles,” whenever the distinction is needed. Beyond that, the current state of research revealed that the Namib Fairy Circles discussed here need to be further subdivided according to the causative agent into Namib Fairy Circles caused either by sand termites or by harvester termites (see Chapter 4).

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