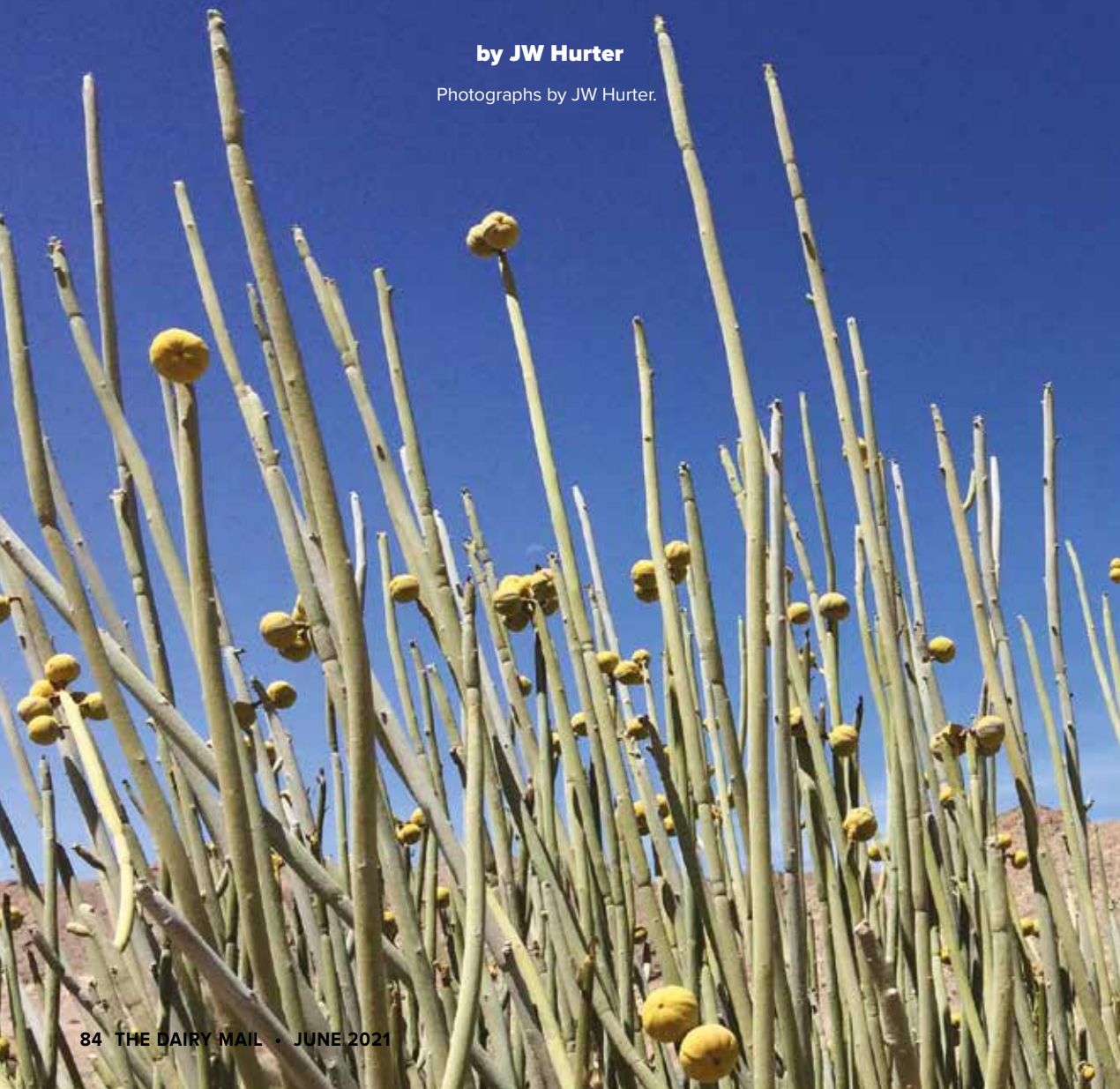


# NAMIBIAN FAIRY CIRCLES

by JW Hurter

Photographs by JW Hurter.



**Scattered across the vast and barren plains of the pro-Namib desert, mysterious patches of soil devoid of any vegetation occur. You would think that a desert is naturally void of any form of life, but a desert, in itself, is one of the most magnificent ecosystems on earth.**

Teeming with life, from fauna to flora, it is held in delicate balance by the symbiotic relationships between organisms. Stems of grasses, which appear to have died a long time ago, provide insects with just the right amount of moisture and shade to survive.

Throughout the desert plains, these tufts of grasses occur between 20 cm and 60 cm from one another, until they are suddenly arranged in a circle, forming a 'fairy circle'.

#### **LOCAL BELIEFS**

This natural phenomenon has long attracted the attention of the world's foremost researchers and

documentarians, and has been visited by scientists from Germany, England, the United States, and Australia. Even Sir David Attenborough has included this mystery in his documentary series, *Planet Earth*.

Scientists have spent years formulating theories as to what causes the fairy circles. At the very beginning, the local people of Namibia were convinced that a dragon living beneath the surface of the earth would, when provoked by heaven knows what, breathe fire and scorch everything in its path, not only resulting in one of the oldest deserts on earth, but specifically forming fairy circles in the sand where the flames were in direct contact with the plants growing in the vicinity.



## SCIENCE THEORIES

In 1979, Prof. GK Theron from the University of Pretoria published a peer-reviewed article in *The South African Journal of Botany* on the topic of the Namibian fairy circles. Prof. Theron proposed that fairy circles are formed due to allelopathy. Allelopathy is the communication between plants through the use of chemical compounds, which are usually volatile. The communication is of such a nature that the Damara milk-bush (*Euphorbia damarana*), for example, would release chemicals into its direct environment, killing the grasses growing in its surroundings so as not to have to compete with them for survival.

European scientists developed a theory based on termite activity. They determined that termites would feed on the roots of grasses, killing the poor plants in the process, and by observing the pesky little insects, they noted that the termites would then venture out in search of new grasses to 'murder' in a radial fashion circling out from the nest, ultimately resulting in the grasses dying in a circular fashion.

Another research team proposed that the circles formed merely because of the competition for resources between the aforementioned tufts of grasses. Since there are very limited nutrients and moisture in desert sand, the best candidate between those grasses competing with each

other, would take the top spot on the podium, while the other would gracefully bow out of this life, to decompose and disappear forever.

This theory was followed by another, proposing that toxic carbon monoxide is slowly seeping through the soil surface from below and is at high enough concentrations to be detrimental to plant life. However, none of these theories have been widely accepted by the scientific community ... until now.

“Allelopathy is the communication between plants through the use of chemical compounds, which are usually volatile.”

## THE MYSTERY UNRAVELLED

Fifty years after the formal discovery of fairy circles, a new study titled, “The allelopathic, adhesive, hydrophobic, and toxic latex of *Euphorbia* species is the cause of fairy circles investigated at several locations in Namibia”, has been published in *BioMed Central Ecology*, a United Kingdom-based scientific journal, which

Fairy circles on the Giribes Plain in northern Namibia.





The trace compound, euphurternitrile, identified in fairy circle soil linking it to *Euphorbia* species.

has grabbed the world's attention. One of Africa's oldest mysteries has finally been solved.

A team of researchers at the University of Pretoria, who have been working on the cause and maintenance of Namibian fairy circles, has determined the milk-bush to be behind the 50-year-old mystery. The milk-bush synthesises latex-rich and sticky milk sap as a defence mechanism in order to repel herbivores, by drying and locking up the mouths of insects and trying its best to taste revolting to herbivores whose jaws are stronger than the latex is sticky.

After intense scientific research, the team of experts compared the chemical constituents of the milk-bush species (*Euphorbia damarana*, *Euphorbia gummifera*, and *Euphorbia gregaria*) with the chemistry of the soil samples collected from the fairy circles and found a footprint molecule – euphurternitrile, originating from *Euphorbia*. This footprint was found to be present in the fairy circles, but not in the matrix (the area between the circles), proving that euphorbias were once present where fairy circles occur today.

Furthermore, it was determined that the milk sap alters the sand's physical properties to such an extent that it repels water (rendering it hydrophobic – scared of water). Water cannot penetrate the surface and seep through; instead, it flows over the surface to a place where the sand is no longer hydrophobic and infiltrates the sand there.

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### TOXIC MILK SAP

The research team didn't stop there. They decided to investigate the initial allelopathic theory proposed by Prof. Theron and found that the latex contains toxic compounds, which kills the plant growth promoting bacteria. These bacteria surround the roots of the grasses and are necessary to sustain plant life in such horrid conditions. Without it, the plant would die – as it does. Experts confirmed their theory by discovering fairy circles where *Euphorbia* species are growing but have not been recorded to date.

The ultimate and most probable theory concludes that the succulent produces a detrimental environment for grasses by releasing toxic milk sap into the soil and changing its physical and chemical properties, resulting in the magical formation of fairy circles. [mpo](#)

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