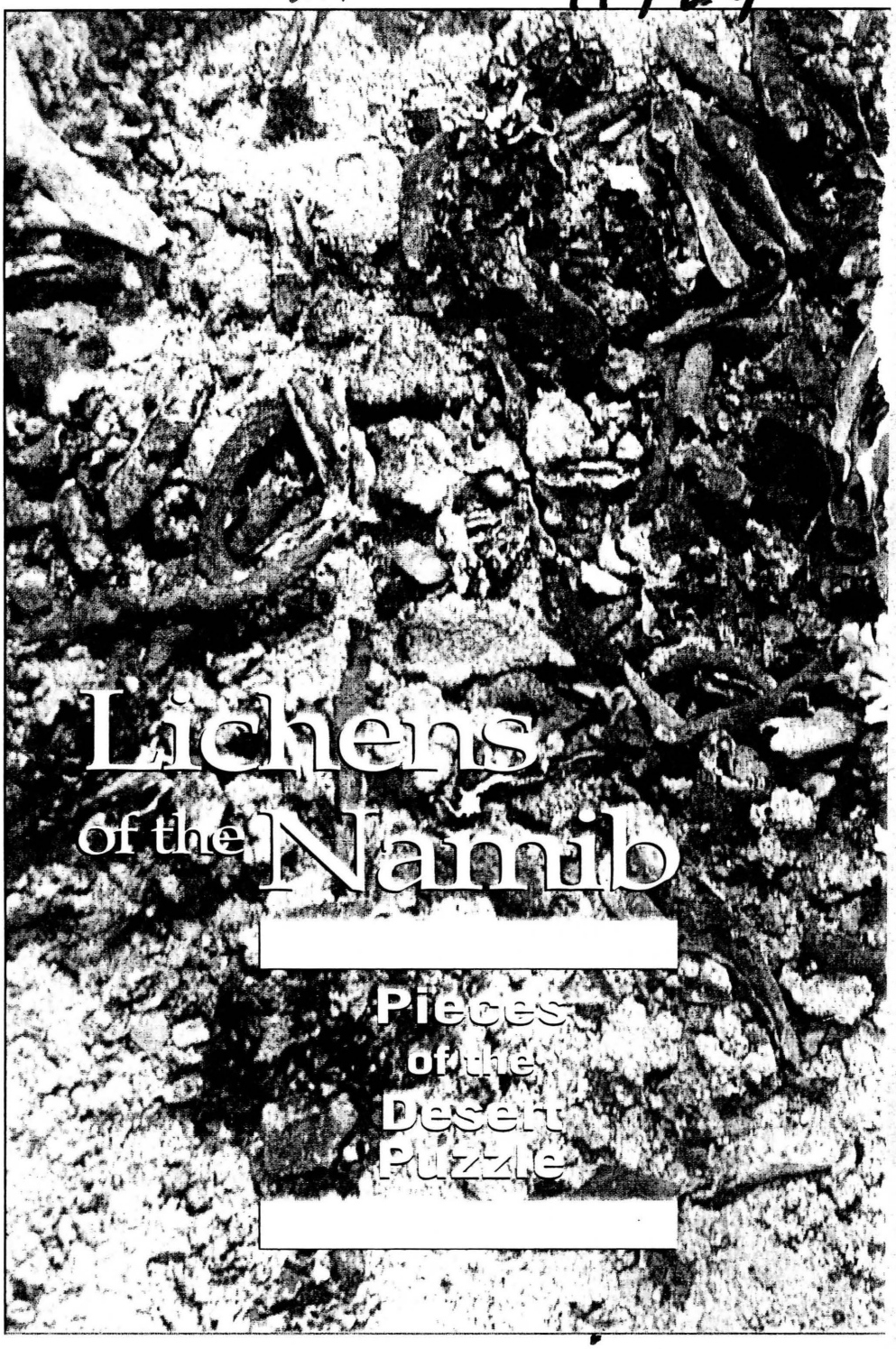

Lichens of the Namib

Pieces of the Desert Puzzle

The life of the Namib Desert is built like a puzzle out of many little pieces which combine to form an overall picture. Each puzzle piece is important to the whole, however small in itself.

For many years the Desert Research Foundation of Namibia (DRFN) has worked piece by piece to solve the Namib puzzle. Gradually, the ecological picture is becoming more complete.

Some of the key pieces in the Namib's desert ecology are lichens – symbiotic organisms made up of fungi and algae. Together the fungi and algae carry out the functions necessary for the existence of the lichen, each giving to the other according to its abilities.

The fungus portion of the organism provides physical support through its stabilizing root system, which is also involved in essential nutrient uptake from the soil or stony substrate. Its surface area is covered by a fungal cuticle which protects the fragile organism from desiccation and the aggressive rays of the desert sun.

In partnership, the algae carries out photosynthesis, providing energy in the form of carbohydrates by transforming light and carbon dioxide, an ability particular to green plants and some bacteria.

The frame of the complicated Namib picture puzzle comprises the fascinating occurrence of fog in a desert, an alternative source of water for organisms living in this harsh environment. Numerous investigations by DRFN researchers have explored the Namib's unique weather conditions and the adaptations of organisms to survive and, in some cases, benefit from them. For example, lichens have the ability to absorb and use fog water and the nutrients dissolved in it through their leaves and fine root system.

If no water is available, the lichens dry out and sink into a state of "suspended animation", where they do not carry out any costly metabolic activities, thus surviving stressful times of extreme dryness. In fact, for many lichens, the wet and drying cycle is an essential part of their existence: effective photosynthesis depends on this.

On foggy mornings the coastal plains appear a lush blue, green or brilliant orange. What looked ash grey the previous afternoon turns to vivid colours, indicating life processes. This is because the fungal layer of the lichen becomes transparent when wet, creating a window for the photosynthetically active green or orange pigments of the algae. The algae is then able to use the low light conditions of a foggy morning to make its contribution to the life of the lichen.

Along the Namib's coast lie some of the richest lichen fields in the world. A great variety of species grow there, many of them endemic. Most are restricted to the fog-belt and gypsum crusts, the combination of which provides the habitat most suited to their growth. In these areas lichens play an important role as part of the food-chain. Researchers from Gobabeb have found that many small animals and micro-organisms feed on the nutritious leaves and obtain

PHOTO BY JULIANE ZEIDLER

Lichens have amazing survival techniques. If no water is available they dry out and sink into a state of suspended animation. A few drops of moisture will revive them, and immediately all life processes start again.

water, as well as nutrients, from them. Animals such as beetles may even find shelter under lichens, protected there from the sun's rays and from the wind.

Since lichens are not the most obvious and extravagant looking organisms, their importance and beauty are often overlooked. Lack of knowledge can result in thoughtless human action, which threatens and destroys the delicate organisms. The numerous vehicle tracks visible on Namib lichen fields are one example. Every track laid on the plains leaves a long-lasting scar. Research has shown that some lichens need up to 40 years to regenerate after being driven over. And where the protecting lichen cover is destroyed, erosion works unchecked: the vehicle track is then blown out thoroughly by the wind, deepening the scar. Much of our knowledge about vehicle damage to lichens comes from a project recently completed at Gobabeb.

by Juliane Zeidler

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