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Rock-colonizing plants: abundance of the endemic cactus *Mammillaria fraileana* related to rock type in the southern Sonoran Desert

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Establishment, colonization, and permanence of plants affect biogenic and physical processes leading to development of soil. Rockiness, temperature, and humidity are accepted explanations to the influence and the presence of rock-dwelling plants, but the relationship between mineral and chemical composition of rocks with plant abundance is unknown in some regions. This study documents plant species growing on rocks, their capacity as rock colonizers measured by the Importance Index, and the relationships between the chemical composition of rocks and the abundance of the dominant plant. The community is composed of eight species and is dominated by the small cactus *Mammillaria fraileana*. Sites with low abundance of this species contain volcanic breccias, high amounts Ca, Fe, Mg, Ti, Al, and Mn as part of moderately weatherable minerals, such as plagioclase and pyroxene. Sites with higher abundance contain rhyodacite, rhyolite, and andesite rocks rich in more weatherable minerals, such as volcanic glass and minerals containing Si, K, and Na. K and Na were present in equal proportions only at the site with more plants. Since Na is toxic for most plants, an experiment was carried out to assess its effect on the survival of *M. fraileana* seedlings. Decreased survival occurred as the concentration of Na increased. Even in the treatment without Na, survival decreased slightly. In summary, presence and abundance of plants is related to the type of bedrock, their weathering characteristics, and proportion of elements. The interactions among elements, rather than the isolated effect of specific elements, could be the most reliable explanation for local variations in the abundance and dominance of *Mammillaria fraileana* in rocky habitat in the southern Sonoran Desert

Palabras clave: Cactus nutrition, Colonization, Rock weathering, Saxicolous desert plants