

Use of plant biodiversity in predictions and environmental analysis in locust biotopes in the Algerian Sahara

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Abstract

The Algerian Desert occupies a large part of the African Sahara. This study aims to provide insights into the phytosociological context, focusing on the classes and alliances hosting the Desert Locust in the Saharo-Sindian and Saharo-Sahelian areas. We investigated four regions of the Algerian Sahara, with altitudes ranging from 300 to 1050 m, and considered six additional localities from literature, with two in the Saharo-Sindian region and four in the Saharo-Sahelian region. Sampling dates were adjusted to insect presence. Plant assemblages were defined using Ward's clustering method to ensure balanced sampling. Correlation analysis was used to estimate the link between Desert Locust density and various environmental parameters, including vegetation alliance proportions. Hierarchical classification revealed 16 plant assemblages that do not clearly fit into the established phytosociological system. Desert Locust abundance was positively linked to the percentages of Saharo-Sindian plants and the Antirrhino-Pithuranton scopariae alliance, but negatively linked to plants associated with saline-gypsum soils. The Antirrhino-Pithuranton scopariae, like the Acacio-Panicion, is a desert steppe found on oued edges but with slightly higher annual rainfall. In certain stations, particularly near Bordj-B-Mokhtar, locust density was not linked to preferred plants, suggesting these areas may serve as survival biotopes. The study also provides a broader view of the requirements for Desert Locusts to enter a gregarious phase, including data from tropical Africa. The dominant vegetation remains the Acacio-Panicion, with flora mainly Saharo-Sahelian and Sahelo-Sudanian. The habitat of the Desert Locust is clearly defined by plant assemblages linked to the Acacio-Panicion alliance, with significant differences between the vegetation associated with solitary and gregarious individuals.

Keywords: *Acacio-Panicion, Vegetation, Sahara, Desert Locust*