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ABSTRACT BOOK 2019

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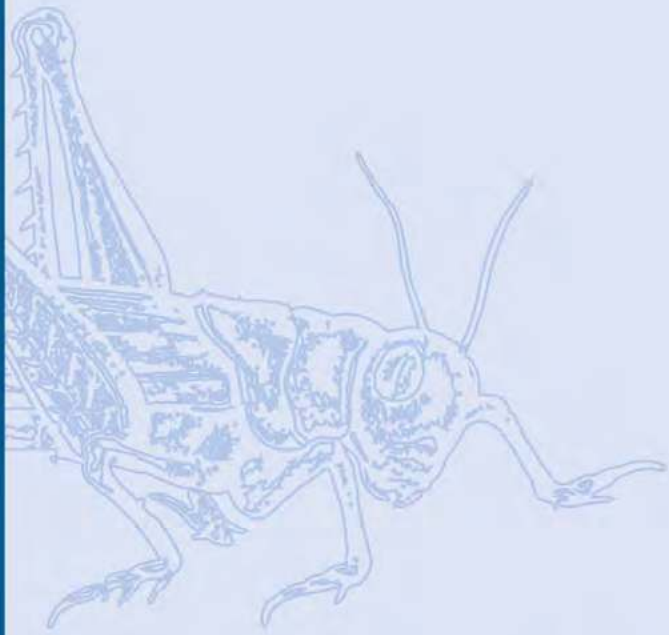

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Effects of climate and environmental change on Orthoptera

CLIMATE-DRIVEN GEOGRAPHIC DISTRIBUTION OF THE DESERT LOCUST DURING RECESSION PERIODS: SUBSPECIES' NICHE DIFFERENTIATION AND RELATIVE RISKS UNDER SCENARIOS OF CLIMATE CHANGE

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The desert locust is an agricultural pest that is able to switch from a harmless solitarious stage during recession periods, to swarms of gregarious individuals that disperse long distances and affect areas from western Africa to India during outbreak periods. Large outbreaks have been recorded through centuries, and the Food and Agriculture Organization keeps a long-term, large-scale monitoring survey database in the area. However, there is also a much less known subspecies that occupies a limited area in southern Africa. We used large-scale climatic and occurrence data of the solitarious phase of each subspecies during recession periods to understand whether both subspecies' climatic niches differ from each other, what is the current potential geographical distribution of each subspecies, and how climate change is likely to shift their potential distribution with respect to current conditions. We evaluated whether subspecies are significantly specialized along available climate gradients by using null models of background climatic differences within and between southern and northern ranges, and applying niche similarity and niche equivalency tests. The results point to climatic niche conservatism between the two clades. We complemented this analysis with species distribution modeling to characterize current solitarious distributions and forecast potential recession range shifts under two extreme climate change scenarios at the 2050 and 2090 time horizon. Projections suggest that, at a global scale, the northern clade could contract its solitarious recession range, while the southern clade is likely to expand its recession range.

However, local expansions were also predicted in the northern clade, in particular in southern and northern margins of the current geographical distribution. In conclusion, monitoring and management practices should remain in place in northern Africa, and in southern Africa the potential for the subspecies to pose a threat in the future should be investigated more closely.

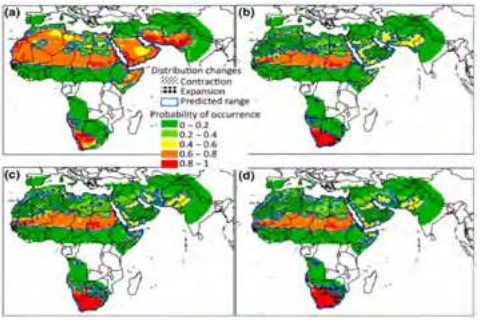

Figure 1. Predictions of distribution changes under two different climate change scenarios (A1B on the left, A2 on the right), for two time-steps (2050 in the upper row, 2090 in the lower row).

Key Words: *Schistocerca gregaria*, pest, species distribution models, niche differentiation, niche overlap, forecasting, phase polyphenism.