Plastic habitat choice in response to landscape change: a multi-scale approach

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Background

Fragmentation of large pristine areas resulting from increasing land-use intensification generally affects species' presence and abundance. However, not every species responds equally to land-use changes and the vulnerability of species may be conditional on their tolerance to human alterations[1].

Understanding the behavioural modifications that enable farmland species to persist after landscape transformation emerges as a key feature to develop effective conservation strategies.

Figure 1. Map showing the land uses in the unaltered protected area (left) ad the managed property (right). Most cover types are present in both areas, but lowlands/marshlands and pasturelands/orange tree plantations are restricted to the protected and the managed site, respectively.

Methods

In 2011 and 2012, we compared habitat selection patterns of Red-necked Nightjars *(Caprimulgus ruficollis)* in the highly protected core of Doñana National Park (southwestern Spain), dominated by well preserved shrublands and forests, and a nearby property dominated by intensively managed crops, cattle-grazed grasslands and remnant shrublands. Despite landscape management, nightjar abundance is highest in the human-dominated area.

Macro-scale approach: we used high-resolution (0.5 m) vegetation maps and ortho-photographs to map cover types (i.e. structural heterogeneity) and used radiotracking data to ascertain the habitat resources required by nightjars (i.e. functional heterogeneity)[2].

Micro-scale approach: we identified individual plants to the species level and analyze compositional differences between sites that were determined to be used by foraging nightjars (i.e. microhabitat use) and random sites (i.e. microhabitat availability).

Results

Macro-scale approach: nightjar activity (i.e. nesting, roosting and foraging) was strongly dependent on land cover types (Fig. 2).

Micro-scale approach: nightjars foraging in the natural area sat nearby tall, dense autochthonous trees (e.g. *Juniperus phoenicea*), whereas in the managed property they commonly used exotic trees with tall, dense appearance (e.g. *Acacia saligna, Nicotiana glauca, Casuarina equisetifolia*) (Fig. 2).

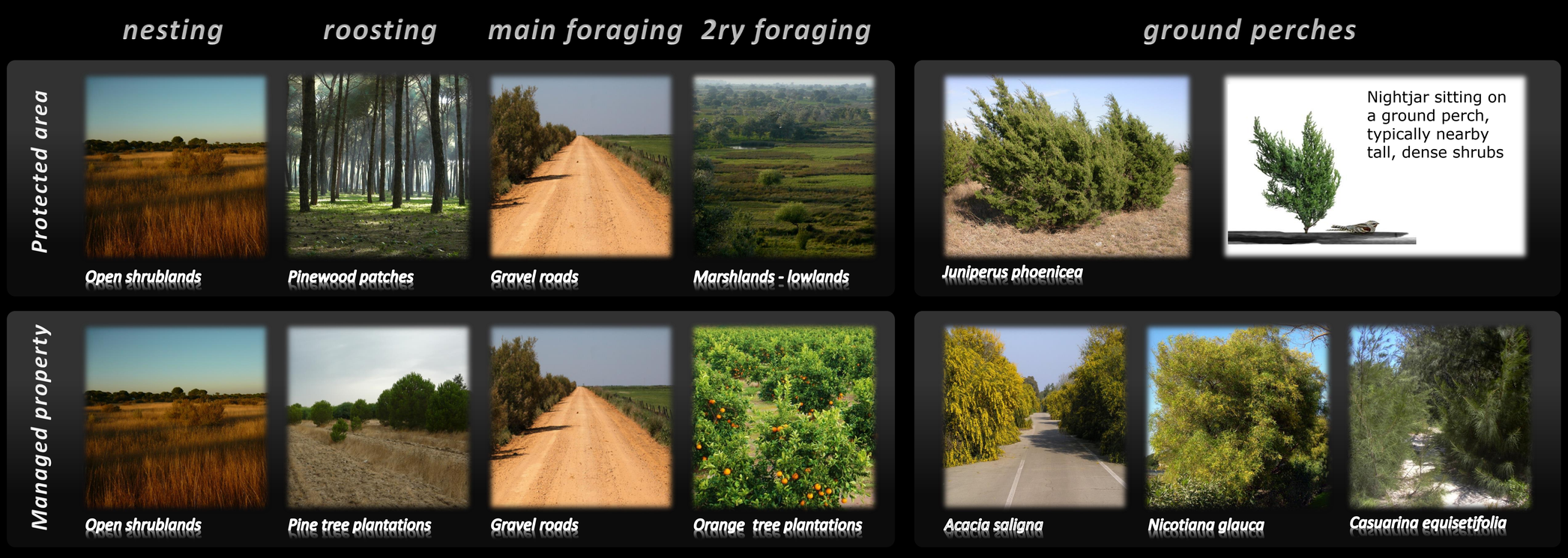

Figure 2. Macro (left) and micro (right) habitat selection patterns of Red-necked Nightjars at both study sites.

Conclusions

1. Species tolerant to anthropogenic alterations (i.e. having high plasticity in habitat choice) could to some extent cope with or even benefit from moderate landscape transformation.
2. The combination of intensively managed areas with less-intensive land uses and remnants of unaltered vegetation (i.e. increased functional heterogeneity) may favour high occurrences of farmland species with multiple habitat requirements and should be hence incorporated into agri-environment schemes.
3. Species requiring particular structural features of landscape elements, as opposed to those requiring specific plant species, might be able to overcome drastic habitat changes, as those due to introduction of invasive, exotic species.

ADAPTING TO GLOBAL CHANGE IN THE MEDITERRANEAN HOTSPOT
Seville 18-20 September 2013

References

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Acknowledgements

SEO/Birdlife provided partial support. Personnel from the LAST-EBD helped with the GIS analyses.