# Influences of forest type and habitat structure on bird assemblages of oak (*Quercus* spp.) and pine (*Pinus* spp.) stands in southwestern Turkey

Final Thesis by Adam Bergner
Supervisors: Dr. Nicklas Jansson & Prof. Per Milberg

## BACKGROUND & AIMS

Oak forest stands in the eastern Mediterranean basin support a high biodiversity, but are under risk of being transformed into managed pine stands. Here, birds were used as indicators to assess how the two habitats work in supporting biodiversity. The aims were to survey and compare bird assemblages of oak and pine stands, and identify associations between birds and vegetation parameters.

## MATERIALS & METHODS

Breeding birds were counted using fixed-radius point taxation in 15 stands of oak and 17 stands of pine in Isparta province, southwestern Turkey (Figure 1). Birds sharing similar nest site preferences were grouped to create six guilds (Table 1). Vegetation parameters recorded in each forest stand included average stand age, tree trunk density, average tree trunk circum-ference and shrubs and ground vegetation cover.

**Figure 1.** Map of Turkey with study area.

| GUILD | EXAMPLE BIRDS |
|---|---|
| Primary hole-nesters | Woodpeckers |
| Secondary hole-nesters | e.g. Parids |
| Ground-nesters | Warblers |
| Shrub-nesters | *Sylvia*-warblers |
| Low-canopy nesters | e.g. Jay, Blackbird |
| High-canopy nesters | e.g. Orioles |

**Table 1.** Classification of bird guilds.

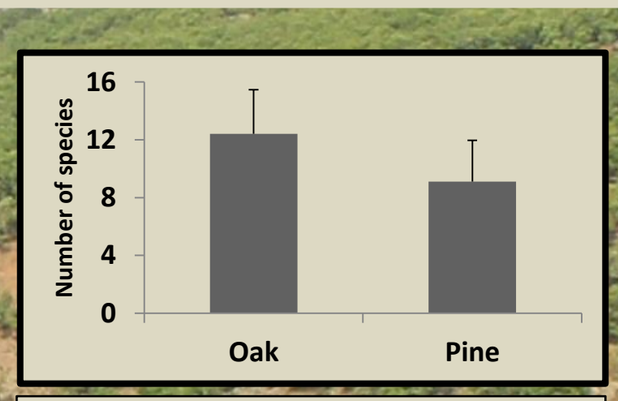


**Figure 2.** Each oak stand supported in average 36 % more bird species than each pine stand.

Typical pine habitat and two of its associated species: Krüper's Nuthatch (upper) and European Serin.
Bird photos from Wikimedia Commons.

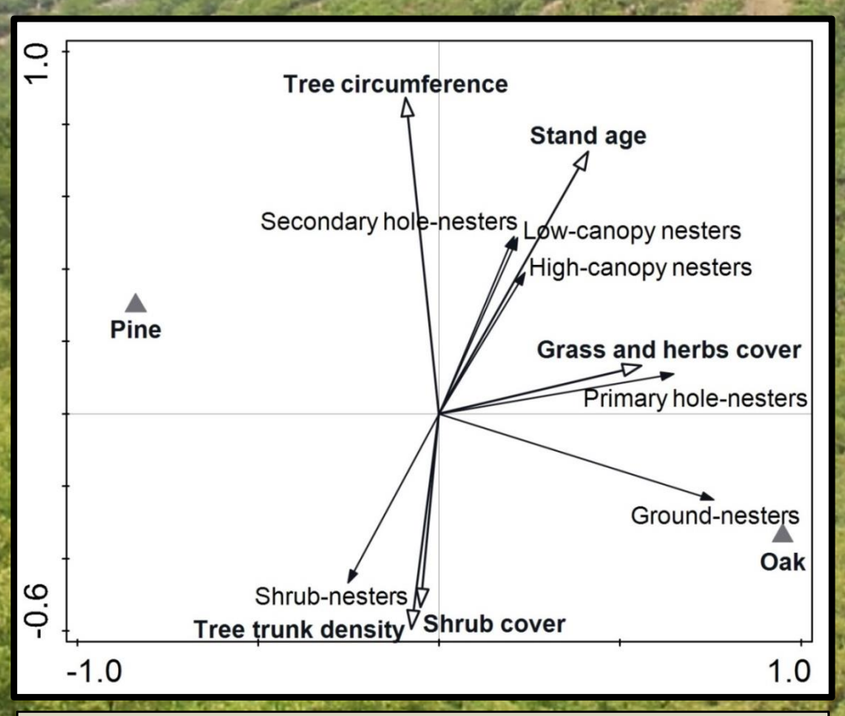


**Figure 3.** Redundancy analysis (RDA) ordination showing the associations between bird assemblages and stand parameters.

Typical oak habitat and two of its associated species: Middle-Spotted Woodpecker (upper) and Rüppell's Warbler.
Bird photos from Wikimedia Commons.

## RESULTS

A total of 40 bird species were registered in the surveyed forests. Oak stands supported a higher number of unique species and higher bird species richness and diversity than pine stands of the same age (Figure 2). The total density of forest birds did not differ between stands of pine and oak. Bird assemblages of oak stands differed from those of pine stands in species composition. A multivariate analysis showed that different guilds were associated with different stand parameters. Stand age best explained the observed differences in bird assembly structure (Figure 3).

## CONCLUSIONS

- Bird assemblages differ between conifer and broadleaved forest stands, possibly reflecting differences in resource availability and distribution.
- Since different guilds have different stand structure preferences, keeping variable forest stands is important to enhance overall bird species richness.
- Oak stands need protection for the survival of highly oak-associated species.

**ACKNOWLEDGEMENTS**
I am grateful for all logistic support provided by Prof. Mustafa Avcı and co-workers at the Forest Ministries in Isparta and Eğirdir. The study was financially supported by ERASMUS and the Swedish International Development Cooperation Agency (SIDA).
The study is a contribution from the "Turkish Oak Habitat Project".

**CONTACT**
Adam Bergner
IFM Biology, Linköping University
adam.bergner@yahoo.se