MOMOTIDAE AS POTENTIAL BIOINDICATORS OF TROPICAL FOREST ALTERATIONS: DENSITY ESTIMATES AND HABITAT PREFERENCES

Dayron Lopez[1], Federica Fonda[2], Flavio Monti[3], Matteo Dal Zotto[4*]

[1]Department of Life Sciences and Systems Biology, University of Turin, Via Accademia Albertina 13, 10123 Turin, Italy
[2]Department of Life Sciences, University of Trieste, Via L. Giorgieri 10, 34127 Trieste, Italy
[3]Research Institute on Terrestrial Ecosystems (IRET-URT Lecce), National Research Council of Italy (CNR), Campus Ecotekne, 73100 Lecce, Italy
[4]Department of Life Sciences, University of Modena and Reggio Emilia, Via Campi 213/D, 41125 Modena, Italy

*e-mail: matteo.dalzotto@unimore.it
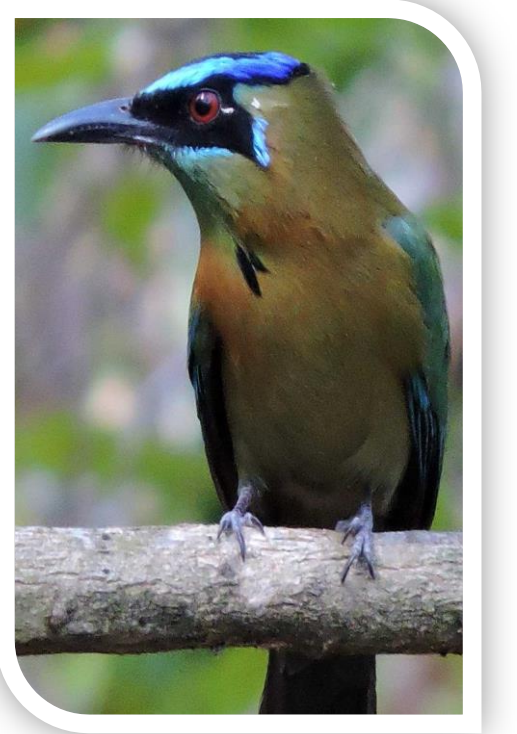
Introduction

➢ Forestry management can shape the structure of habitat types and biodiversity levels (Zahawi *et al.*, 2015; Casas *et al.*, 2016).

➢ Some target species can act as indicators of habitat structure and then be used to improve management actions (Putz *et al.*, 2001).

➢ We explored this idea by investigating density estimates and habitat preferences in two sympatric bird species (Lesson's motmot *Momotus lessonii* and turquoise-browed motmot *Eumomota superciliosa*; Coraciiformes: Momotidae) that could act as potential bioindicators of local and wide scale tropical forest alterations.

Analyses

▪ Distance sampling method was used to obtain density estimates for each species.

▪ The Kilometric Abundance Index (KAI), i.e., the number of detections per transect length, was employed to assess the relative abundances of both species in the two habitats, i.e., transitional dry forest and transitional moist forest.

▪ The nested analysis of variance (ANOVA) was used to test for differences in KAIs.

▪ Cluster Analysis using the Bray-Curtis similarity and Analysis of Similarities on the detections of the two species in the different strata sampled were performed.

Field Methods

Fieldwork in Costa Rica

February-March 2019
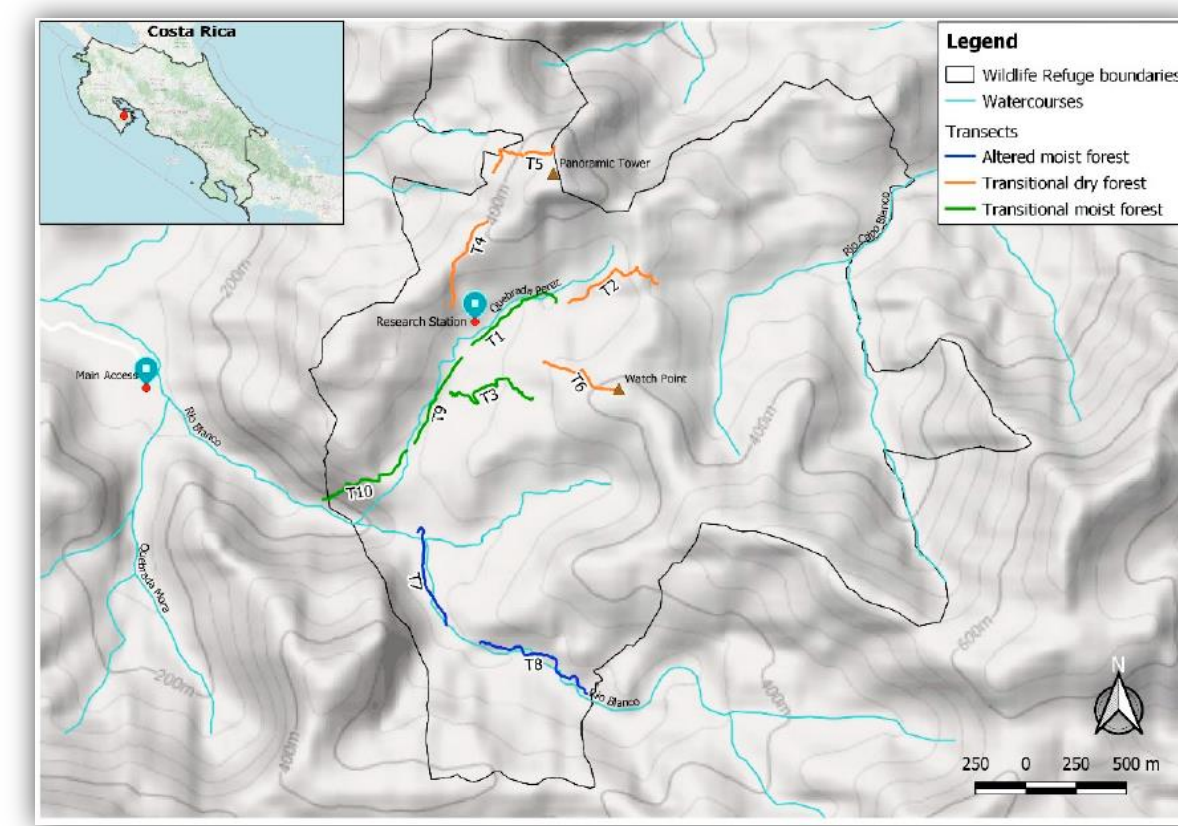
Data collection

- Karen Mogensen Wildlife Refuge (protected area)

- Two main forest habitats (Transitional moist *vs.* Transitional dry forest)
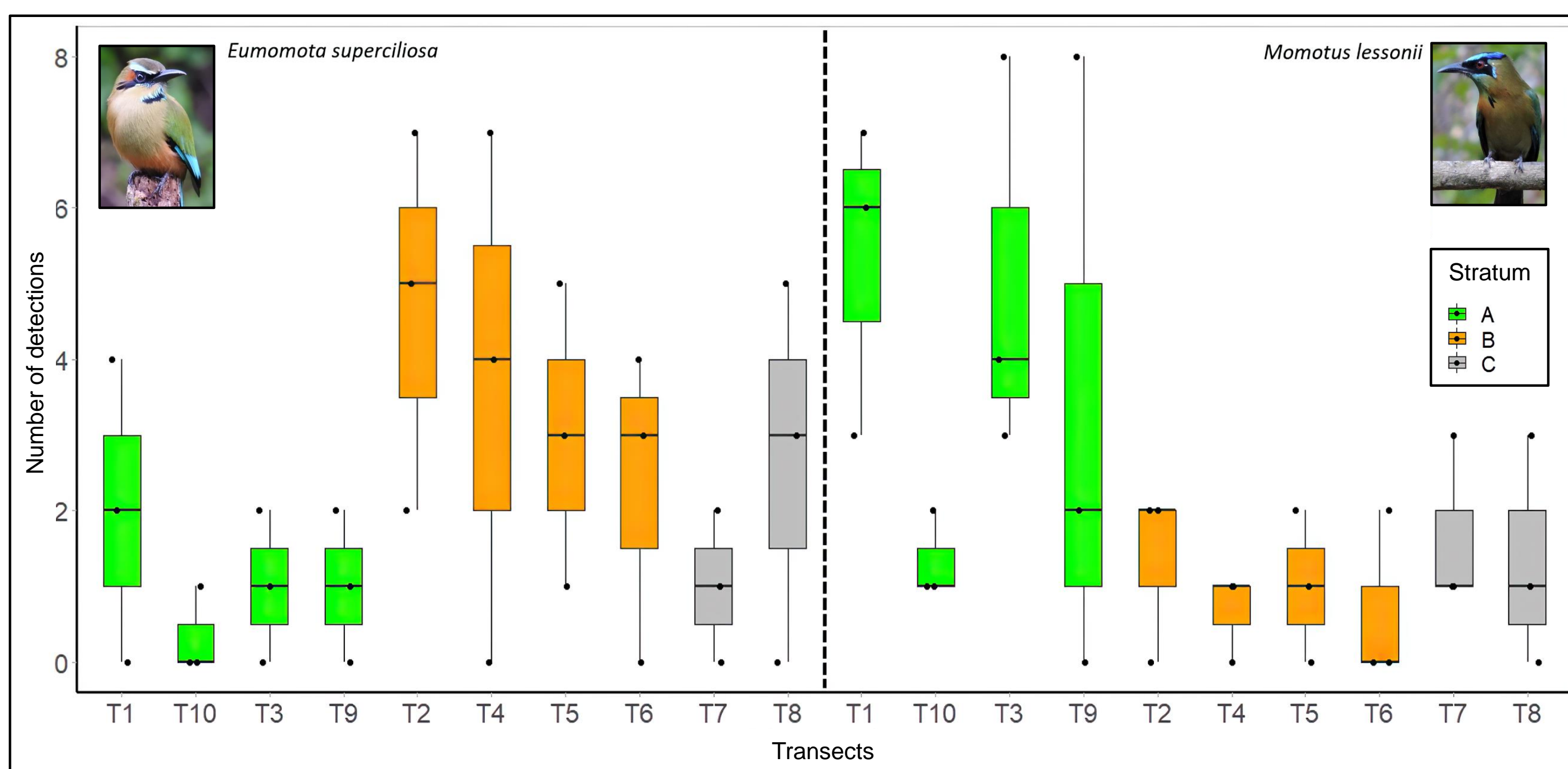- Altered moist forest

- Distance sampling method

- 10 walking transects

- Each transect ca. 570 m long

- Transects surveyed 3 times during the research

Results

❖ Population density of *E. superciliosa*: 22.78 ± 5.70 individuals/km^2, detection probability of 0.36.

❖ Population density of *M. lessonii*: 21.32 ± 5.65 individuals/km^2, detection probability of 0.43.

❖ More records of *E. superciliosa* were achieved along the transects crossing the transitional dry forest, i.e., T2, T4 and T5.

❖ Highest occurrence of individuals of *M. lessonii* were in transects T1, T3, T9, all crossing the transitional moist forest.

❖ Significant differences in the relative abundance for each species in the two habitats were found.

❖ Mean KAIs of *E. superciliosa* were 1.88 in the transitional moist forest and 6.63 in the dry forest.

❖ Mean KAIs of *M. lessonii* were 6.32 in the transitional moist forest and 1.79 in the dry forest.
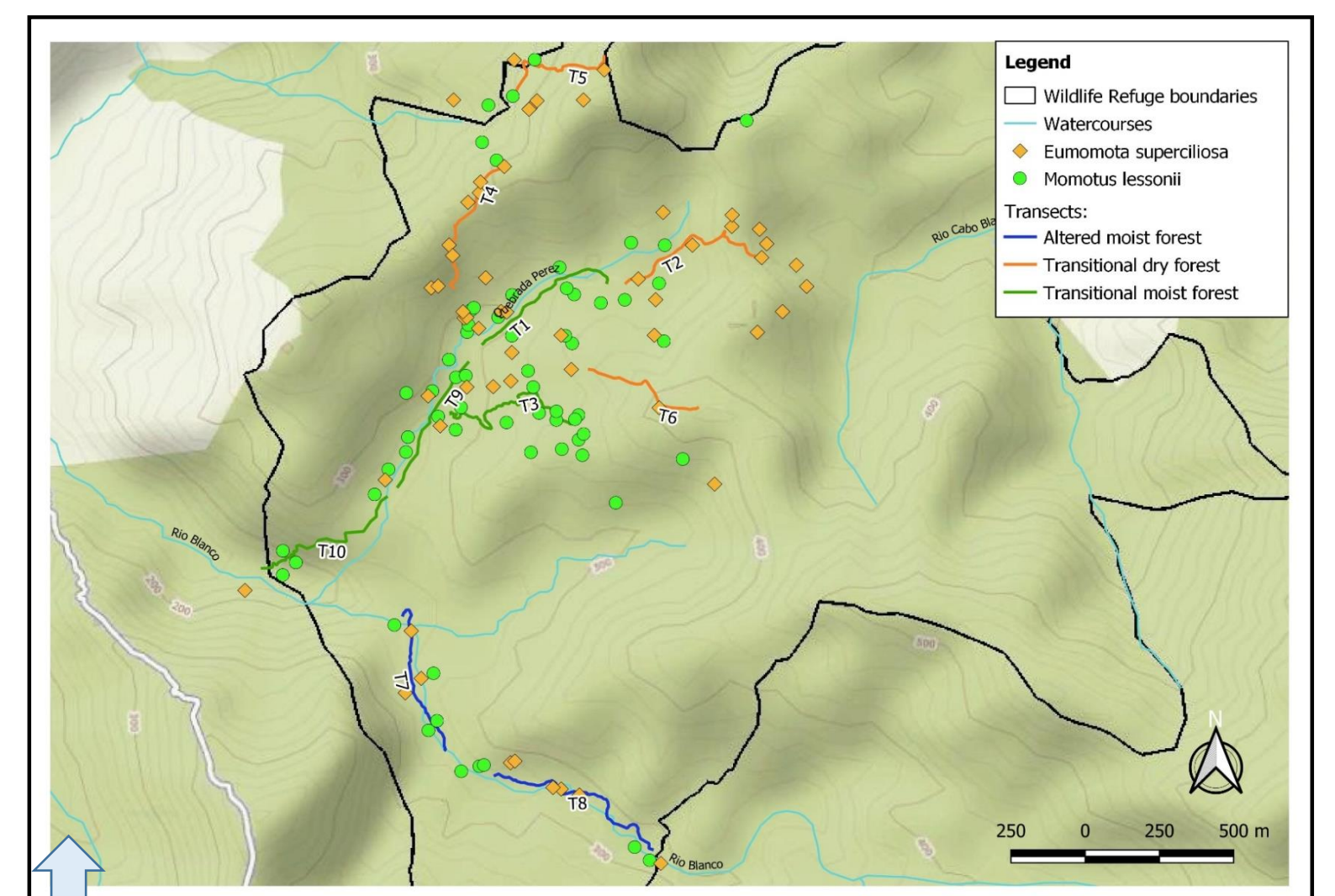
o Map showing all the records of the two species of Momotidae within the Karen Mogensen Wildlife Refuge.

o Transects covered are coded T1 through T10 and colored differently according to the habitat crossed.

Number of detections for the two species obtained through the Distance Sampling method. Stratum A (green): primary transitional moist forest. Stratum B (orange): secondary transitional dry forest. Altered transects (T7 and 78) are reported (stratum C; grey) although not included in the habitat analysis. For each transect (X-axis), values of the three replicates are shown (black dots).
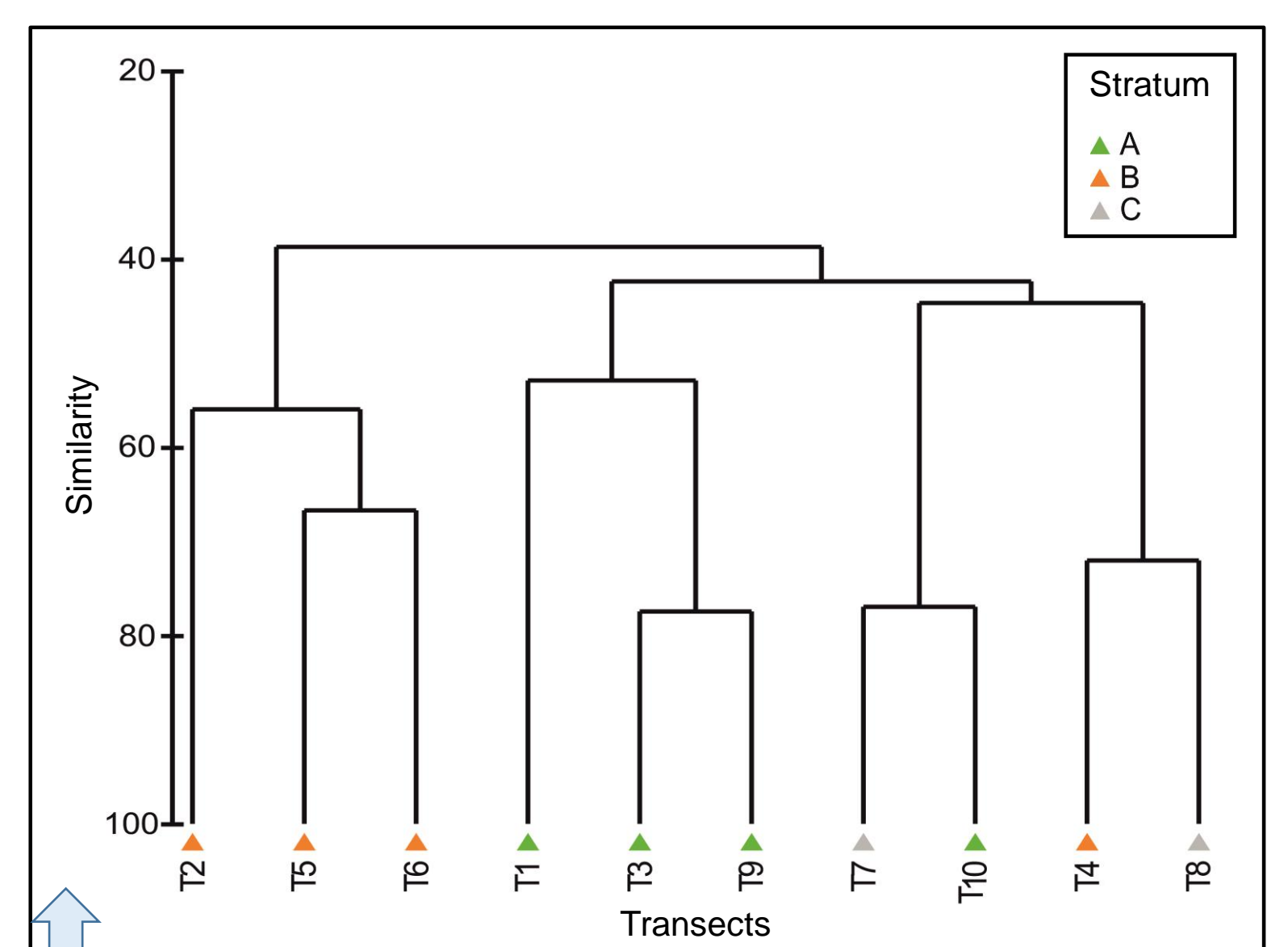
o Dendrogram of the Cluster Analysis using the Bray-Curtis similarity measure on the detection of the two target species (*E. superciliosa* and *M. lessonii*) in the strata sampled within the Wildlife Refuge.

o Stratum A (green): primary transitional moist forest; stratum B (orange): secondary transitional dry forest; stratum C (grey): altered transects.

Conclusions

E. superciliosa tended to be more abundant and preferred the dry forest, whilst *M. lessonii* favored moist environments. The development of arid and semi-arid environments characterized by open areas will probably lead to a numerical increase in *E. superciliosa* densities with a consequent expansion, while the decline of moister and homogeneously forested environments will likely affect negatively *M. lessonii*. The development of balanced conservation measures and forestry management decisions will be of crucial importance for the preservation of the populations of these birds and of the local biodiversity.

Lo studio si è svolto nel Refugio de Vida Silvestre Karen Mogensen (Costa Rica), un'area protetta caratterizzata da due principali habitat forestali, la foresta primaria umida e la foresta secondaria secca, in cui coesistono *Momotus lessonii* ed *Eumomota superciliosa*. Abbiamo stimato densità e preferenze di habitat per le due specie, in funzione della gestione forestale. Le analisi hanno rivelato differenze significative tra i due habitat, con *E. superciliosa* che tendeva ad essere più abbondante in ambienti di foresta secondaria secca e *M. lessonii* in ambienti umidi di foresta primaria. Lo sviluppo di misure di conservazione e decisioni di gestione forestale equilibrate saranno di cruciale importanza per la conservazione delle popolazioni di queste specie e della biodiversità locale.

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