

## **Frequency of occurrence of a set of water related bird species in an archipelago of remnant marshlands in Central Italy.**

Benassi G., Battisti C, 2010. Rendiconti Lincei (under review).

**Abstract:** In an archipelago of marshland fragments in Central Tyrrhenian Italy, we calculated the frequency of occurrence (i.e., the probability that individual of a sensitive species occurs in a fragment of determined size area) of a set of water-related breeding bird species. Only one species (*Cettia cetti*) occurred in marshland fragments within the 0-1 size area class while all species were present in larger size classes. *Acrocephalus scirpaceus* is the only species that showed a significant increase in frequency of occurrence moving from 0-1 to 1-10 ha size area classes. However our study does produce evidence that the frequency of occurrence of several other area-sensitive species (eg. *Tachybaptus ruficollis*, *Ixobrychus minutus*, *Gallinula chloropus*, *Fulica atra*) increases toward larger size area classes, although these trends are not significant. The frequency of occurrence of these species in a wider range of marshland fragments should be a focus of further research. These results will be useful in terms of wetland management implications (e.g., selection of suitable fragments for sensitive species).

**Keywords:** Breeding bird species, Fragments, Frequency of occurrence, Size area, Threshold effect, Central Italy

## **Water level decrease and change in abundance of water-obligate bird species: preliminary data from a remnant wetland of Central Italy.**

Giulia Benassi, Corrado Battisti, 2009. *Aldrovandia*, 5: 229-234.

**Abstract:** We evaluated the effect of a seasonal water level decrease on an assemblage of four water-obligated bird species (Little Greebe *Tachybaptus ruficollis*, Mallard *Anas platyrhynchos*, Common Moorhen *Gallinula chloropus*, Eurasian Coot *Fulica atra*) in a Mediterranean remnant wetland. Following the water level dwindling in wetland channels, diversity index of the bird assemblage decreased significantly from April to July. At the level of single species, Little Greebe and Eurasian Coot showed a significant decrease in abundance index, and Eurasian Coot and Common Moorhen showed a significant decrease of their mean abundance index. When the water level decreased in channels, the reed beds, rush beds and flooded meadows surrounding them dried out reducing the habitat suitability for the water-obligate species. This fact induced a local population decline in the assemblage of sensitive sedentary species. These preliminary data could be useful in order to define further research and to elaborate management strategies focused on the water level regime in wetland fragments.

**Keywords:** Water level, remnant wetland, management, *Tachybaptus ruficollis*, *Anas platyrhynchos*, *Gallinula chloropus*, *Fulica atra*

## **Applying Abundance/Biomass comparisons in breeding bird assemblages of a set of remnant wetlands in Central Italy.**

Benassi G., Battisti C., Luiselli L., 2009. *Journal of Mediterranean Ecology*, 10: 13-20.

**Abstract:** In this study we used a set of data related to a network of 16 wetland fragments in Central Italy (Litorale Romano, Rome) with the aim to study the level of stress experimented by a breeding bird assemblage following the Abundance/Biomasse Comparisons (ABC) approach. A comparison of the ABC curves among fragments showed that the abundance curves never exceeded biomass curves. A partial overlap between the curves was found in the smaller fragments. Fragments with higher surface (> 4 ha) revealed a similar trend of both curves, showing a greater number of species with low abundance values. Larger fragments show strong differences in the abundance/biomass values of individual species, thus indicating that dominant species are characterized by high body weight impacting heavily on the energy balance of the area. Therefore, larger fragments are capable of supporting more species either in the space-level (more niche available for a greater number of species), or trophic-energetic level (more resources and more potential species with high body size and total biomass).

**Keywords:** Abundance, biomass, ABC curves, birds assemblages, wetland fragments

## **Area-sensitivity of three reed bed bird species breeding in Mediterranean marshland fragments.**

Benassi G., Battisti C., Luiselli L., Boitani L., 2009. *Wetlands Ecology and Management*, 17: 555-564.

**Abstract:** Density and species-specific thresholds for three strictly reed bed (*Phragmites australis*) - related bird species (*Ixobrychus minutus*, *Acrocephalus scirpaceus*, *Acrocephalus arundinaceus*), known as area-sensitive and breeding in an archipelago of 16 Mediterranean marshland fragments (Central Italy), were studied with mapping method techniques. No individuals of these species occurred in fragments smaller than 1 ha. Marshland fragments larger than 10 ha hosted all the three study species. We observed a significant increase in mean density between 0–1 and 1–10 ha for *Acrocephalus scirpaceus* and between 1–10 and >10 ha for *Acrocephalus arundinaceus*. Habitat heterogeneity of the marshland fragments was directly correlated to their size area. Therefore, area-sensitivity for the reed bed species can be interpreted also as a heterogeneity-sensitivity effect at fragment scale. In Mediterranean landscapes, a suitable marshland for the entire selected set of reed bed area-sensitive species should have a size greater than 10 ha with a patchy mosaic of reed beds, open waters, and other edge features.

**Keywords:** *Acrocephalus arundinaceus* \_ *Acrocephalus scirpaceus* \_ *Ixobrychus minutus* \_ Minimum area requirement \_ Habitat heterogeneity

**Area effect on bird species richness of an archipelago of wetland fragments of Central Italy.**

Benassi G., Battisti C., Luiselli L., 2007. *Community Ecology*, 8: 229-237.

**Abstract:** Wetlands are naturally patchy habitat types that in fragmented landscapes are usually immersed inside a sea of anthropogenic habitat matrix. Decrease in patch size area and increase of patch isolation are two important components of wetland fragmentation. We investigated the effects of fragment area on bird species richness at four-level assemblages in a highly fragmented Mediterranean wetland system of Central Italy. Our results indicate that fragment area influenced differently the species richness for distinct assemblages in wetland fragments. Area was significantly correlated to total species richness, vagrant, breeding and *Phragmites* - related breeding species (PBS). A comparison of the various regression equations showed that the log-log relationship was the best-fitted model and the amount of variation ( $R^2$  of log-log regression line) was much higher for PBS and breeders than for vagrants. This pattern confirmed that when including vagrants in studies based on the equilibrium theory of island biogeography, the ‘insularity of islands’ is reduced. We also found that higher z-values (regression slope) were associated with PBS and breeding birds, supporting the idea of a ‘matrix effect’ on the studied species.

**Keywords:** Habitat heterogeneity, Habitat loss, Island biogeography, *Phragmites australis*, Wetlands.