ASSOCIATION PATTERNS AND HABITAT USE OF A BOTTLENOSE DOLPHIN (*TURSIOPS TRUNCATUS*) POPULATION IN THE EASTERN LIGURIAN SEA

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INTRODUCTION Despite the bottlenose dolphin (*Tursiops truncatus*) seems to be the most common species in the Eastern Ligurian Sea costal waters (Gnone *et al*., 2006), little is known about the social behaviour of this specie in the area. Bottlenose dolphins are described like social animals extremely interactive with other members of its own species so to have a classifiable society (Lusseau *et al*., 2005). Furthermore, bottlenose dolphins seem to have a "fission-fusion" society with associations between individuals that may be stable in time and space (Würsig & Würsig, 1977).

AIM This study investigates the association patterns between individuals and the social habits of the bottlenose dolphin in the Eastern Ligurian Sea.

MATERIALS AND METHODS Data were collected between 2001 and 2008 during 436 boat-based surveys conducted all around the year, when sea state was less than Beaufort 4. For logistic needs, the study area was divided in 4 portions: A, B, C, D (Fig. 1). Photoidentification mark-recapture technique was applied to study the population structure. A photographic catalogue was built and only animals with at least 5 recaptures were included in this study. The association rate between individuals was measured using 2 Association Coefficient (CoAs): the half weight index (HWI) and the simple ratio (SR). For each index, an association matrix was generated by using SOCPROG2.3 for MATLAB 7.4 by Whitehead (Whitehead, 2008). The cluster analysis and the sociogram were used to visualize the association networks between individuals. In order to determine whether the association patterns between individuals were significantly different from random, the association matrix was permuted (20.000 permutations), following the Manly/Bejder procedure (Manly, 1995; Bejder *et al*., 1998).

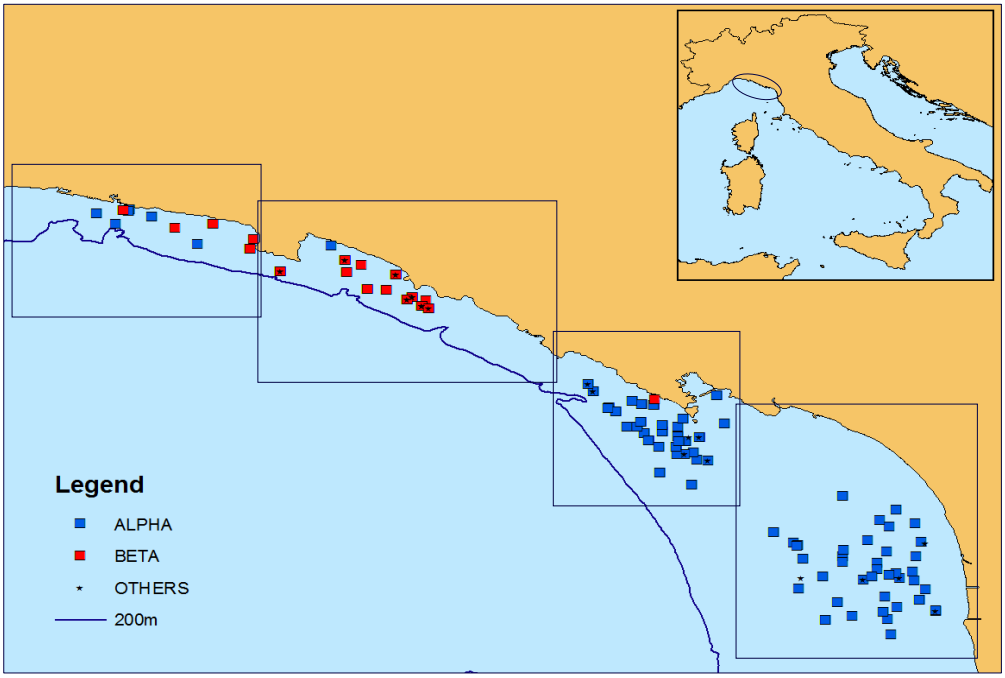

Fig. 1: Bottlenose dolphin sighting distribution in the study area

RESULTS 40 of the 170 bottlenose dolphins of the photographic catalogue were included in the study. Every animal was identified with a code (Id_code) and related with sightings (Fig. 2). Two groups of animals present a clean temporal and spatial separation: Alpha (blue cells) and Beta (red cells). The distribution of the groups along the study area was plotted in the Figure 1. Alpha consists of 17 individuals showing high values of CoAs for both indexes (HWI > 0.73; SR > 0.47). Beta is made up of 20 animals with higher values than Alpha (HWI > 0.95; SR > 0.91). Three animals (Id_54, Id_61 and Id_97) show low values either with Alpha or with Beta and were sighted in turn with Alpha or Beta (grey cells with black star). The cluster analysis and the sociograms, confirm the presence of 2 groups showing higher values of CoAs for pairs belonging to Beta when compared with Alfa (Fig. 3 and 4). The standard deviations of the observed HWI (SD = 0,2758) is significantly greater than the random HWI (SD = 0,1288), confirming the non-random association between pairs.

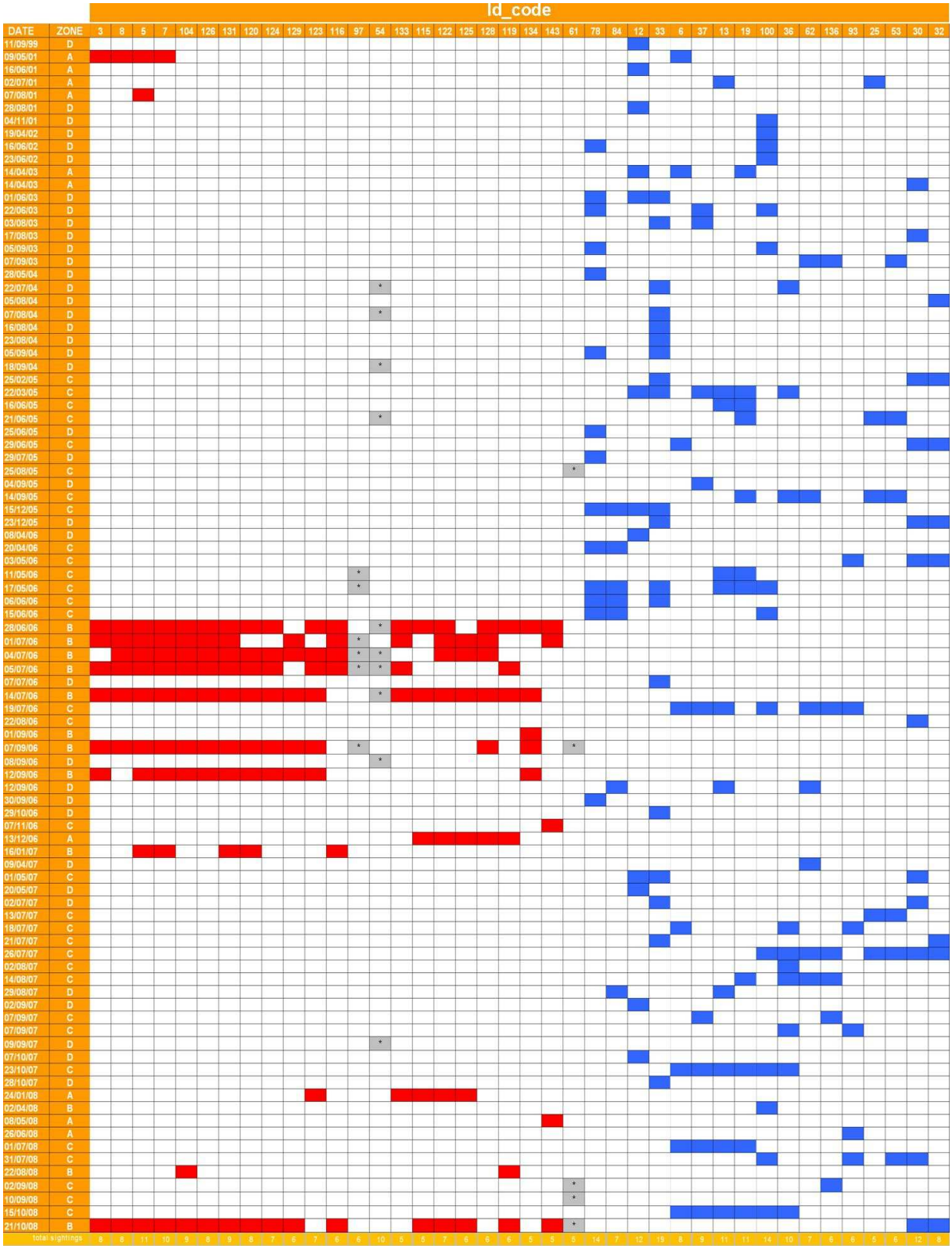

Fig. 2: Sightings vs Individuals

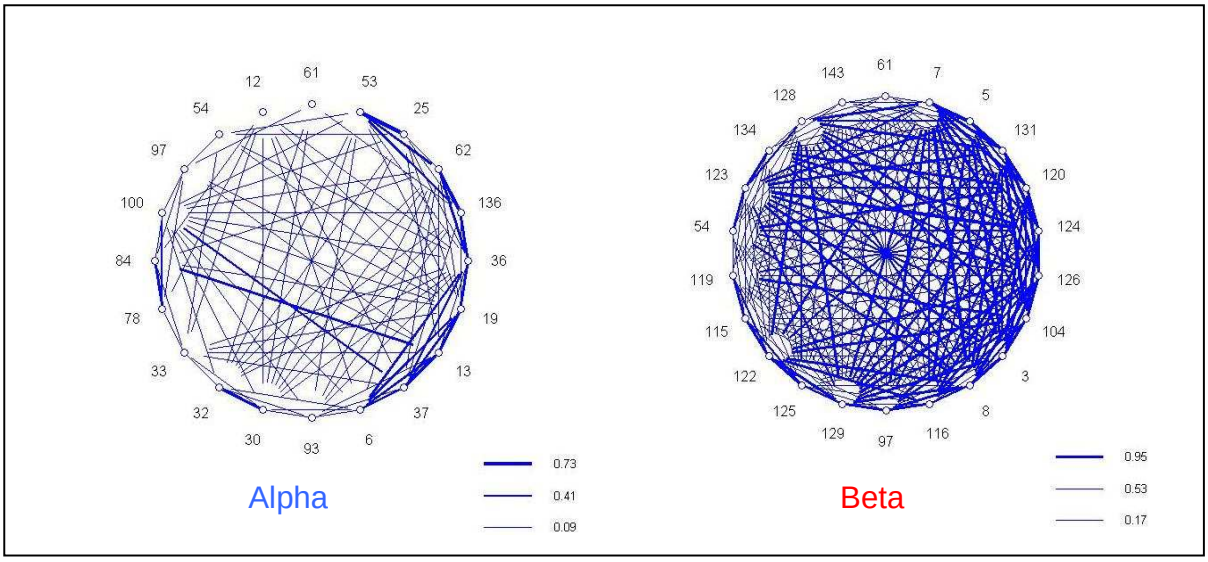

Fig. 3: HWI sociograms for Alpha and Beta: numbers indicate individuals; thicker lines are referred to stronger associations between pairs.

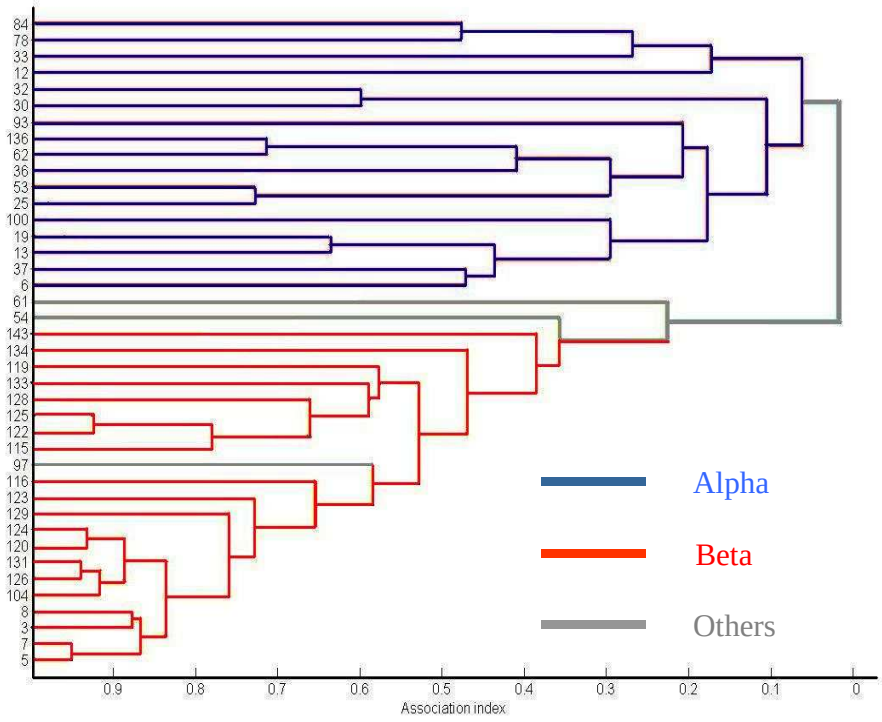

Fig. 4: HWI Cluster Analysis with “average-linkage” method

DISCUSSION AND CONCLUSIONS Alpha and Beta seem to be two groups with different characteristics in terms of site fidelity and social habits. Alpha individuals are regularly present in portions C and D of the study area and they form small and dynamic associations. On the contrary, Beta individuals show a wandering behaviour and form much larger and regular association. Beta occasionally frequents a restricted part of the area (A + B) and rarely mixes with Alpha. This two different behaviours could be correlated, since a wandering group has a stronger need for cohesion between individuals if compared with a sedentary group. Finally, all the considered individuals show preferred associations between pairs, like the permutation test highlights. In order to better understand the bottlenose dolphin social behaviour in the Eastern Ligurian coastal waters, the next step of the study should be improving knowledge about sex of each individual.

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