

ASSOCIATION PATTERNS OF RESIDENT BOTTLENOSE DOLPHINS IN THE RÍA OF AROUSA, NW SPAIN



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INTRODUCTION

Common bottlenose dolphins (*Tursiops truncatus*) are commonly seen in the Ría of Arousa, NW Spain (Díaz López & Methion, 2017) (Figure 1). In this study, we assess the social structure and association patterns of this coastal population of bottlenose dolphins.

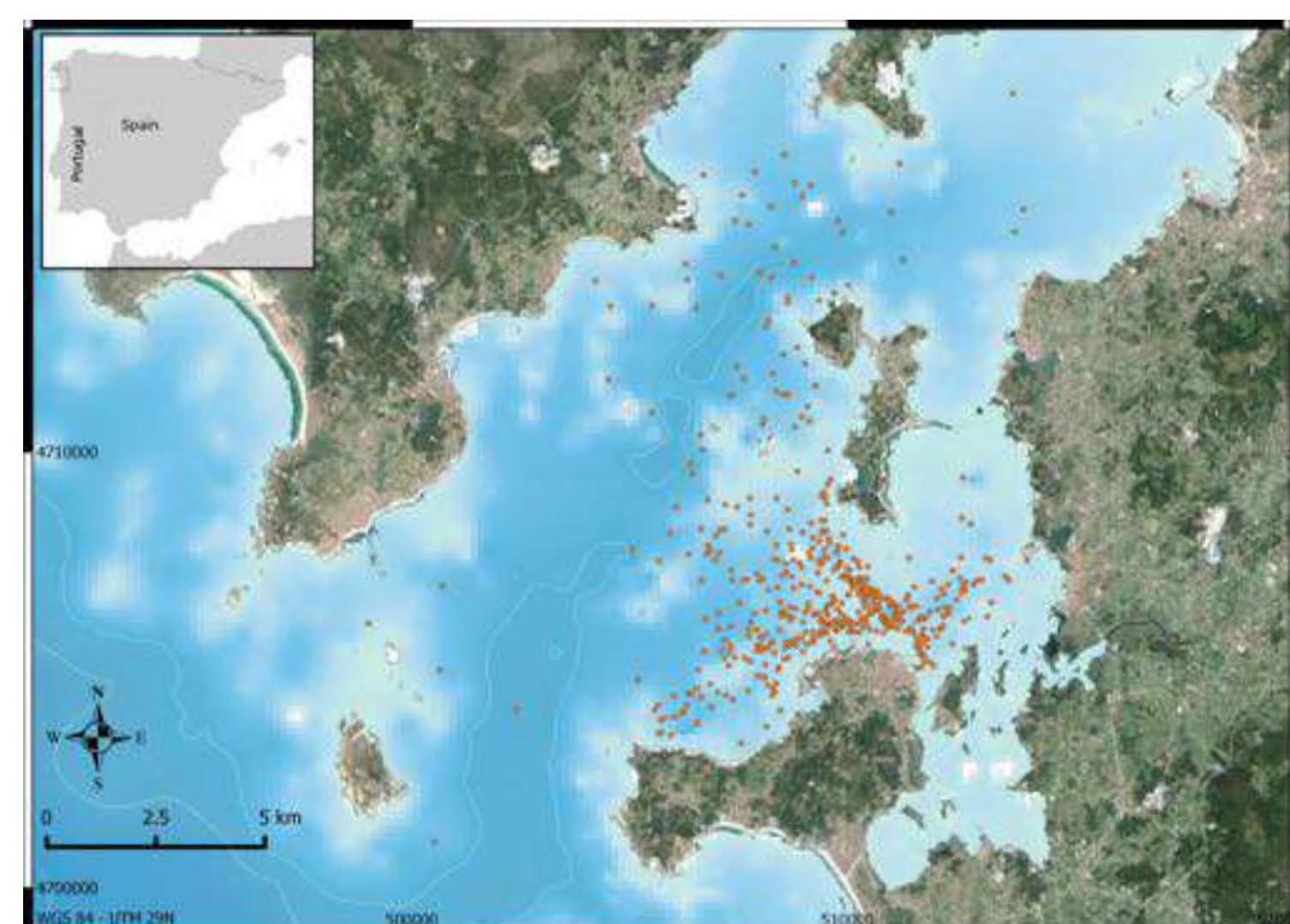


Figure 1. Study area with sighting location.

MATERIAL & METHODS

Data were collected from March 2014 to June 2016 aboard BDRI's research vessel. Individual dolphins were identified from their natural marks present on the dorsal fin (Figure 2). SOCPROG 2.7 (Whitehead 2009) was used to analyze social structure. Coefficients of associations were calculated using the half-weight index (HWI) for resident bottlenose dolphins seen. Dolphins were considered resident if seen at least 10 times and in all seasons of research.



Figure 2. Dorsal fin of bottlenose dolphins.

RESULTS

We carried out 157 daily boat-based surveys in which we monitored the behaviour of 351 groups of bottlenose dolphins during 245 hours. A total of 190 bottlenose dolphins were photo-identified. Association data for 66 resident bottlenose dolphins were analyzed, of which 19 females, 34 males and 13 of unknown sex. Dolphins were seen from 10 to 101 times (mean number of observation = 41 ± 3.3).

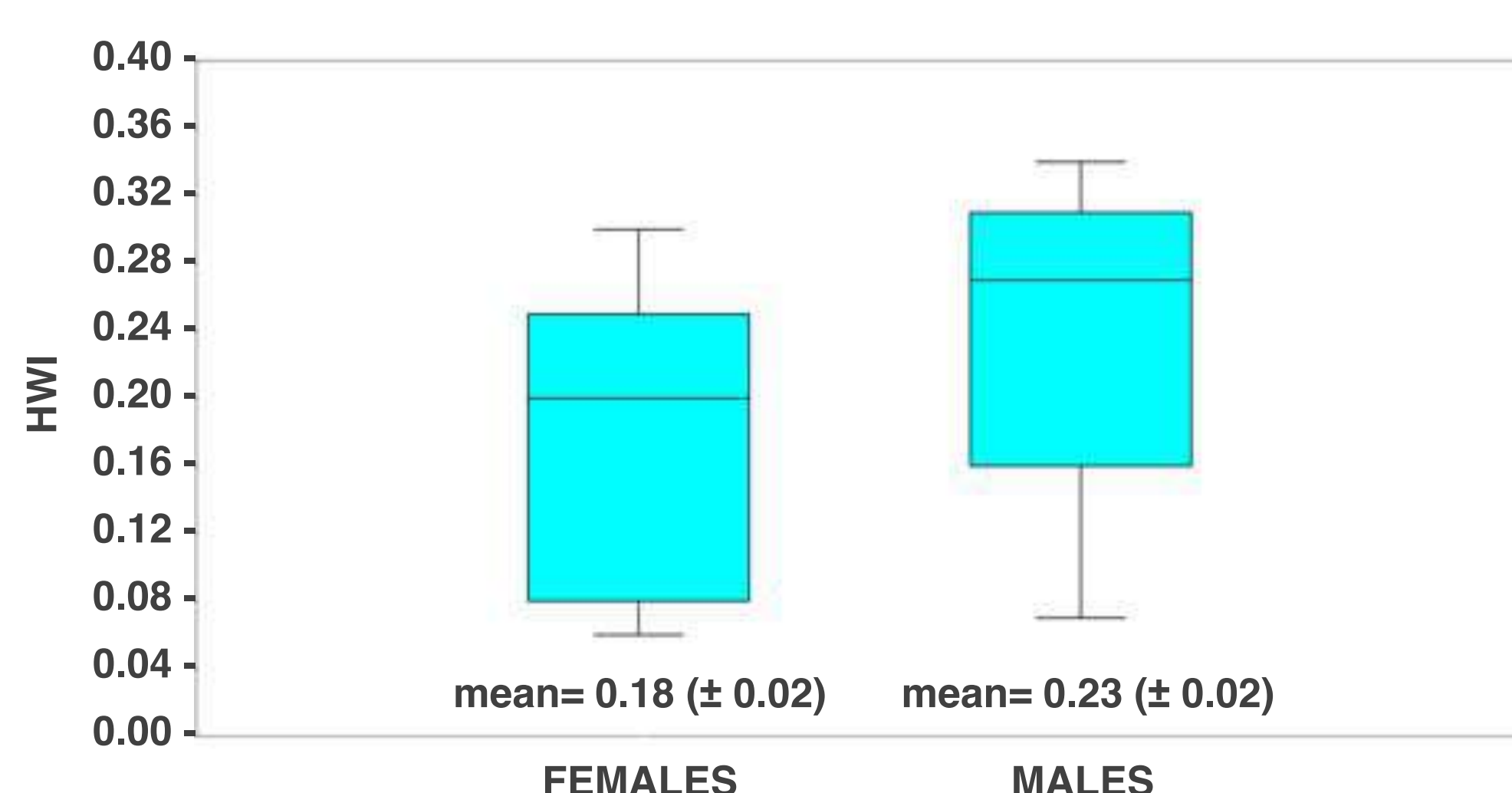


Figure 3. HWI for females and males. Association levels between females and males were different (Mantel test with 1000 permutations, $p < 0.001$).

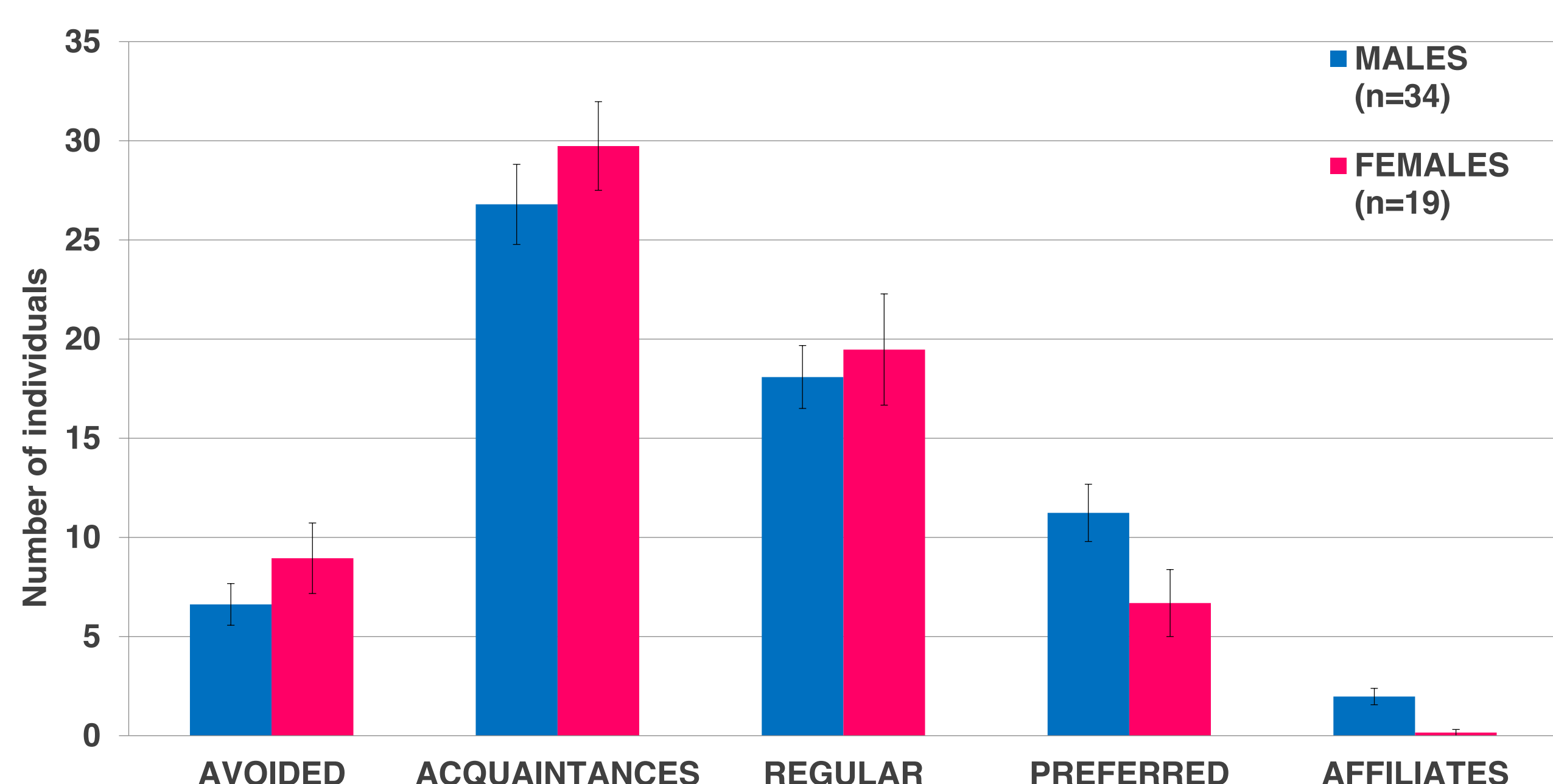


Figure 4. Mean number of associations between genders. Males have significantly more affiliates than females (Mann-Whitney, $p < 0.001$).

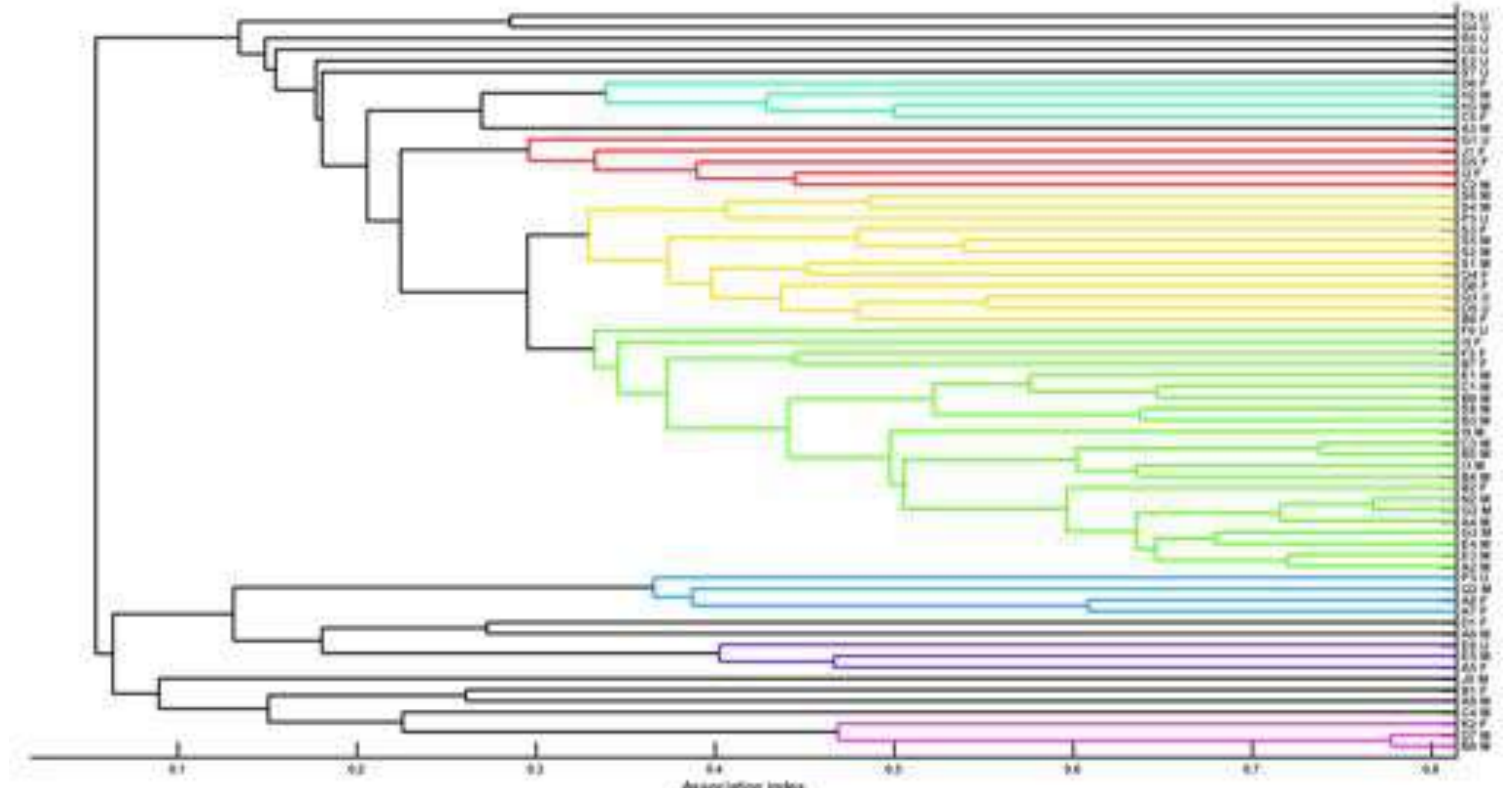


Figure 5. Hierarchical cluster showing the degree of association among resident bottlenose dolphins (clustering using average linkage; CCC= 0.88; modularity 1 for gregariousness: 0.09).

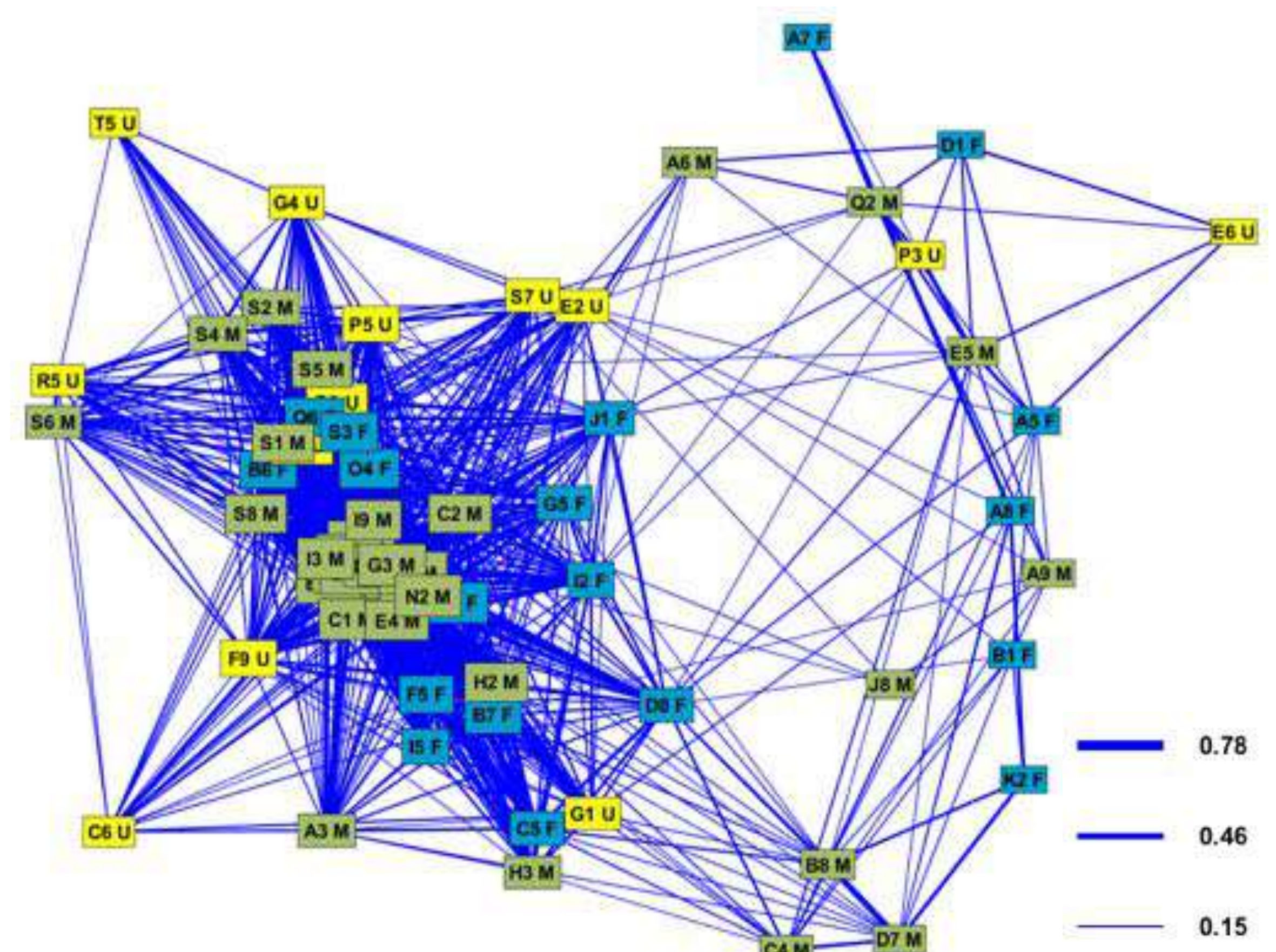


Figure 6. Network diagram of association indices with multidimensional scaling arrangement.

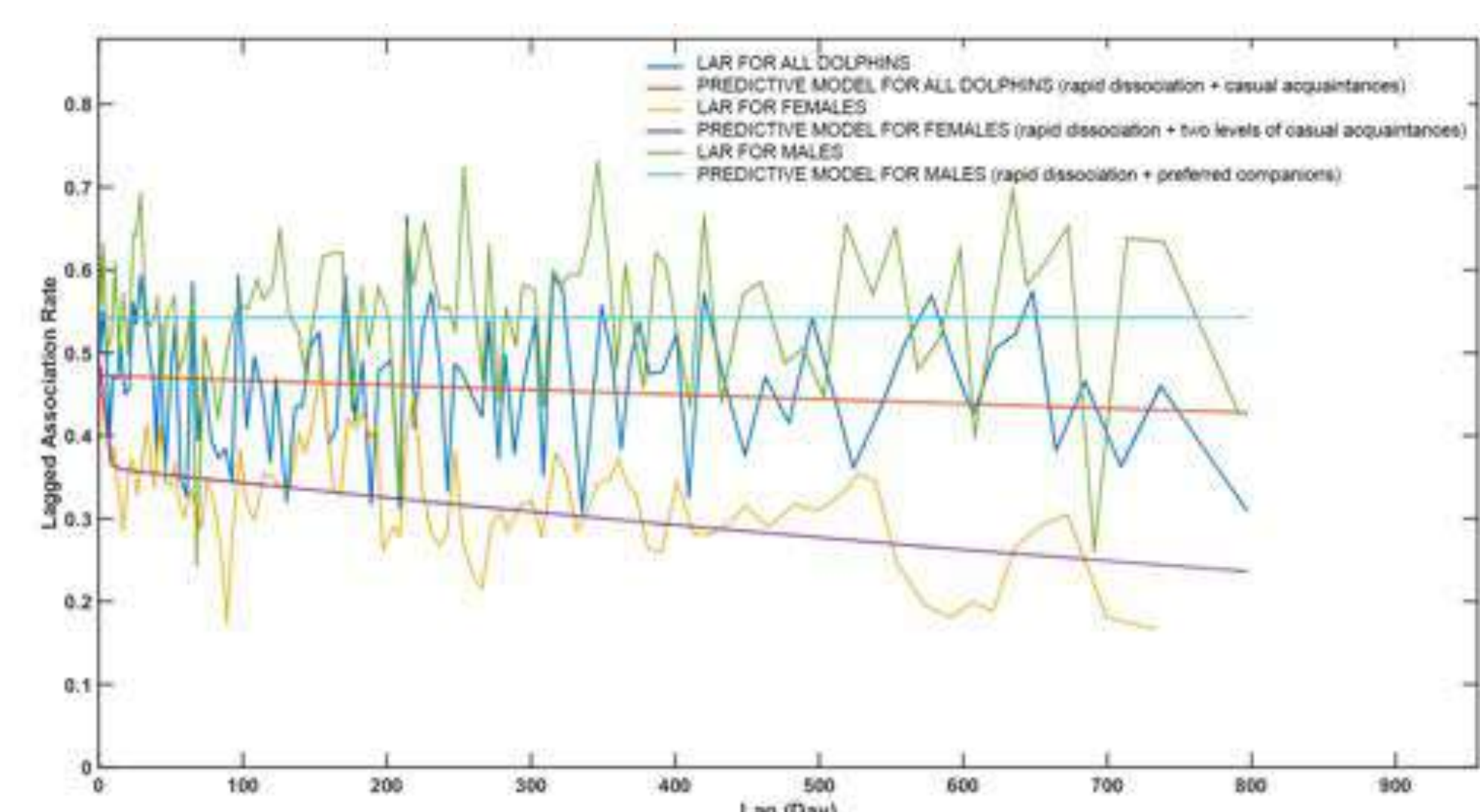


Figure 7. Lagged association rate (LAR) and predictive models best adjusted to the data.

CONCLUSION

- Presence of **resident** bottlenose dolphins in the Ría of Arousa with clear fission-fusion society.
- Presence of two **mixed-sex communities**, not isolated from each other.
- Both males and females show **preferred associations**.
- **Males** have **stronger associations** than females and form **preferred associations constant over time**.
- **Females** tend to form more **casual acquaintances**.
- A combination of environmental and anthropogenic parameters, kinship and demographic processes could explain the community division and preferential associations.

REFERENCES

- Díaz López, B., Methion, S., 2017. Impact of shellfish farming on bottlenose dolphin's use of habitat. *Marine Biology* 164:83.
- Whitehead, H., 2009. Socprog programs: analyzing animal social structures. *Behaviour Ecology and Sociobiology* 63: 765-778

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