



SOCIAL STRUCTURE OF BOTTLENOSE DOLPHINS IN THE AROUSA FIRTH, GALICIA, SPAIN



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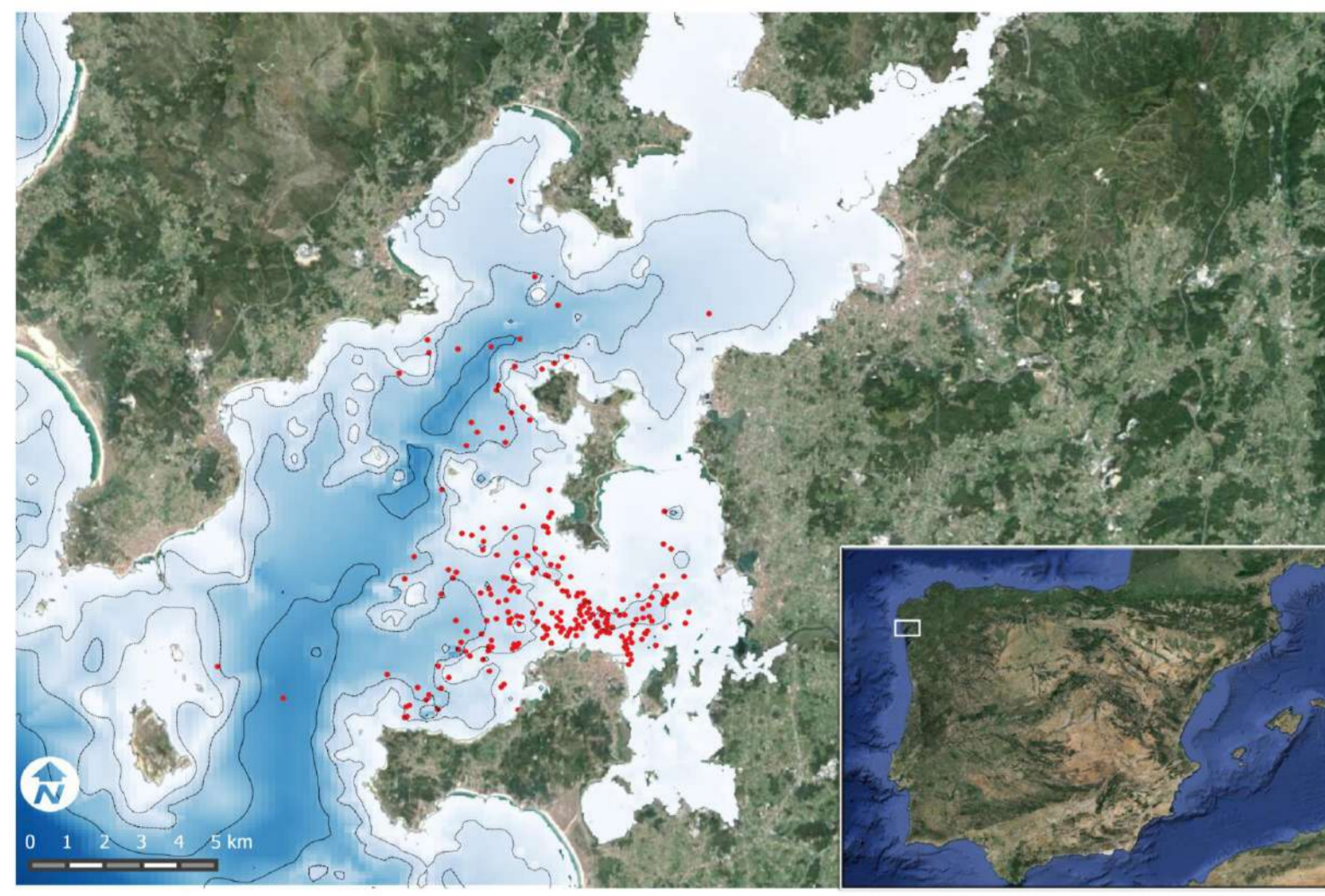


Figure 1. Study area (red points show the sightings).

INTRODUCTION

Presence of bottlenose dolphins (*Tursiops truncatus*) have been commonly reported in Galician waters (López *et al.* 2004). However, this is the first study of their social structure. The aim of this study is to assess the association patterns of a population of coastal bottlenose dolphins in the Arousa firth, Galicia, Spain (Figure 1).



Figure 2. BDRI's research vessel.

METHODS

Data were collected from march 2014 to march 2015 aboard BDRI's research vessel (Figure 2). Individuals were identified from their natural marks present on the dorsal fin (Figure 3). SOCPROG 2.4 (Whitehead 2009) was used to analyze social structure. Coefficients of associations were calculated using the half-weight index (HWI) for individuals seen more than 5 times.



Figure 3. Examples of identified individuals.

RESULTS

- 79% of the observed dolphins in each group presented marks and a total of 140 marked individuals were identified.
- 42 dolphins (30% of the total) were recaptured more than 5 times; including 7 females, 11 males and 24 individuals of unknown sex.

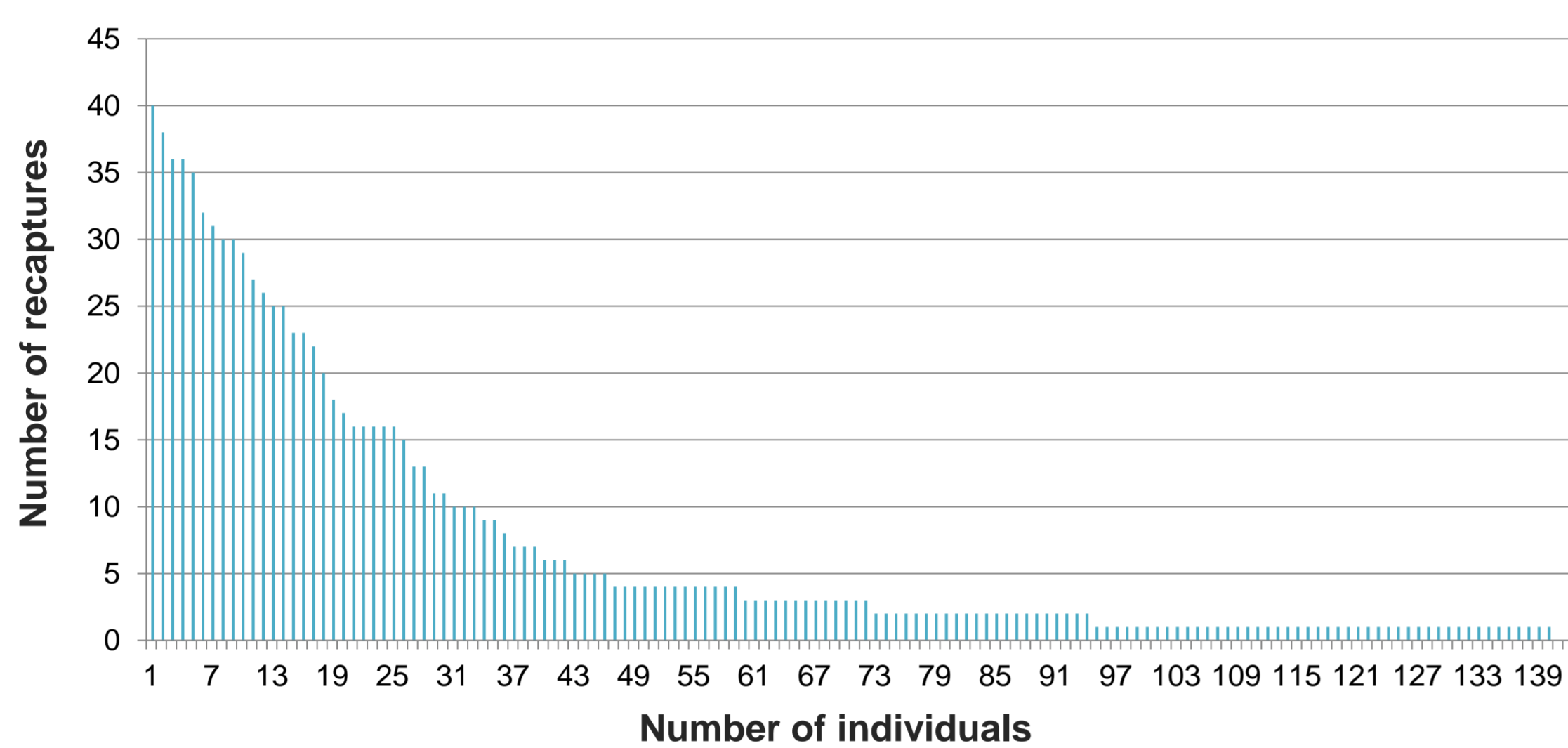


Figure 4. Number of recapture per individual. Mean= 7.16 ± 0.82 (1-40).

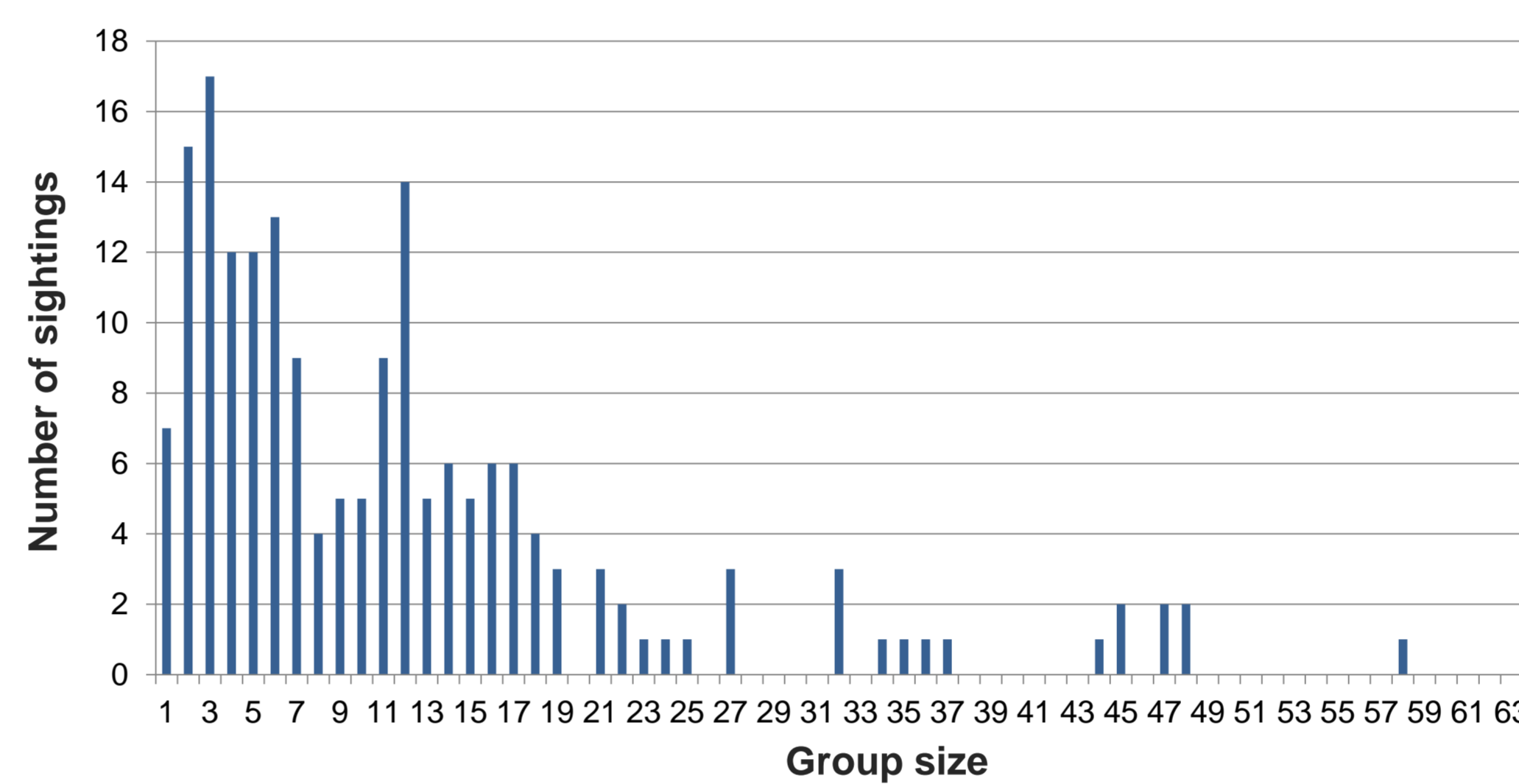


Figure 5. Group size distribution. Mean= 12.11 ± 0.85 (1-64).

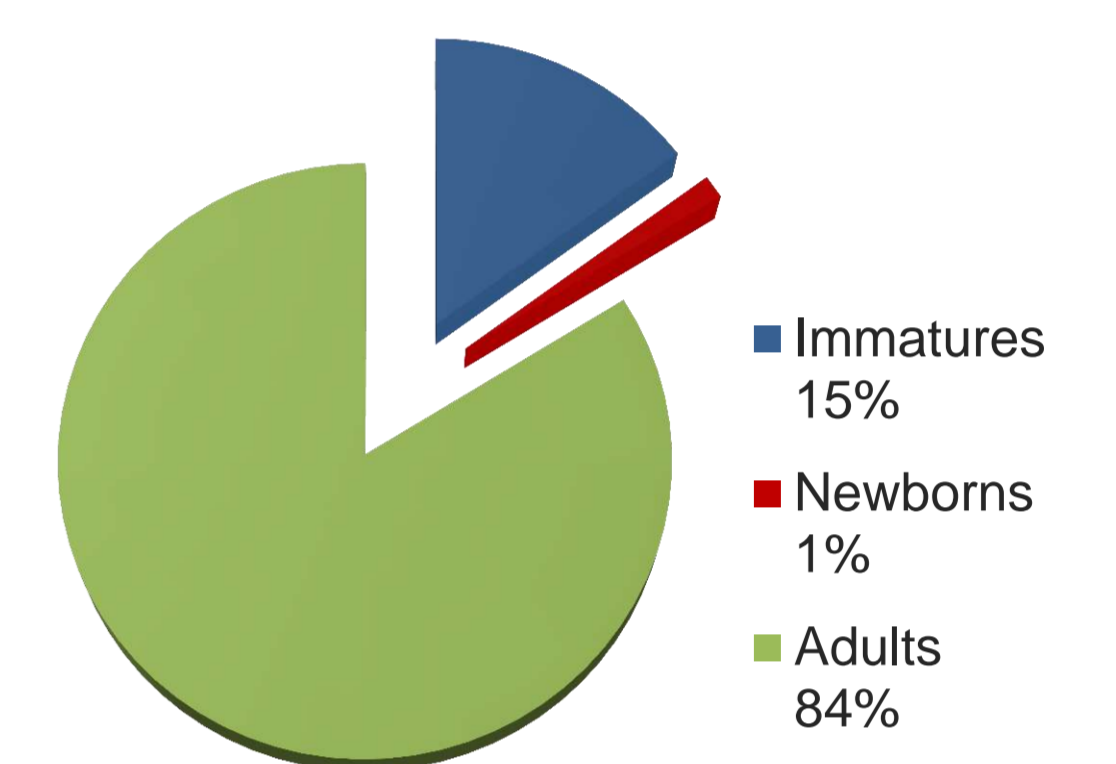


Figure 6. Age class distribution.

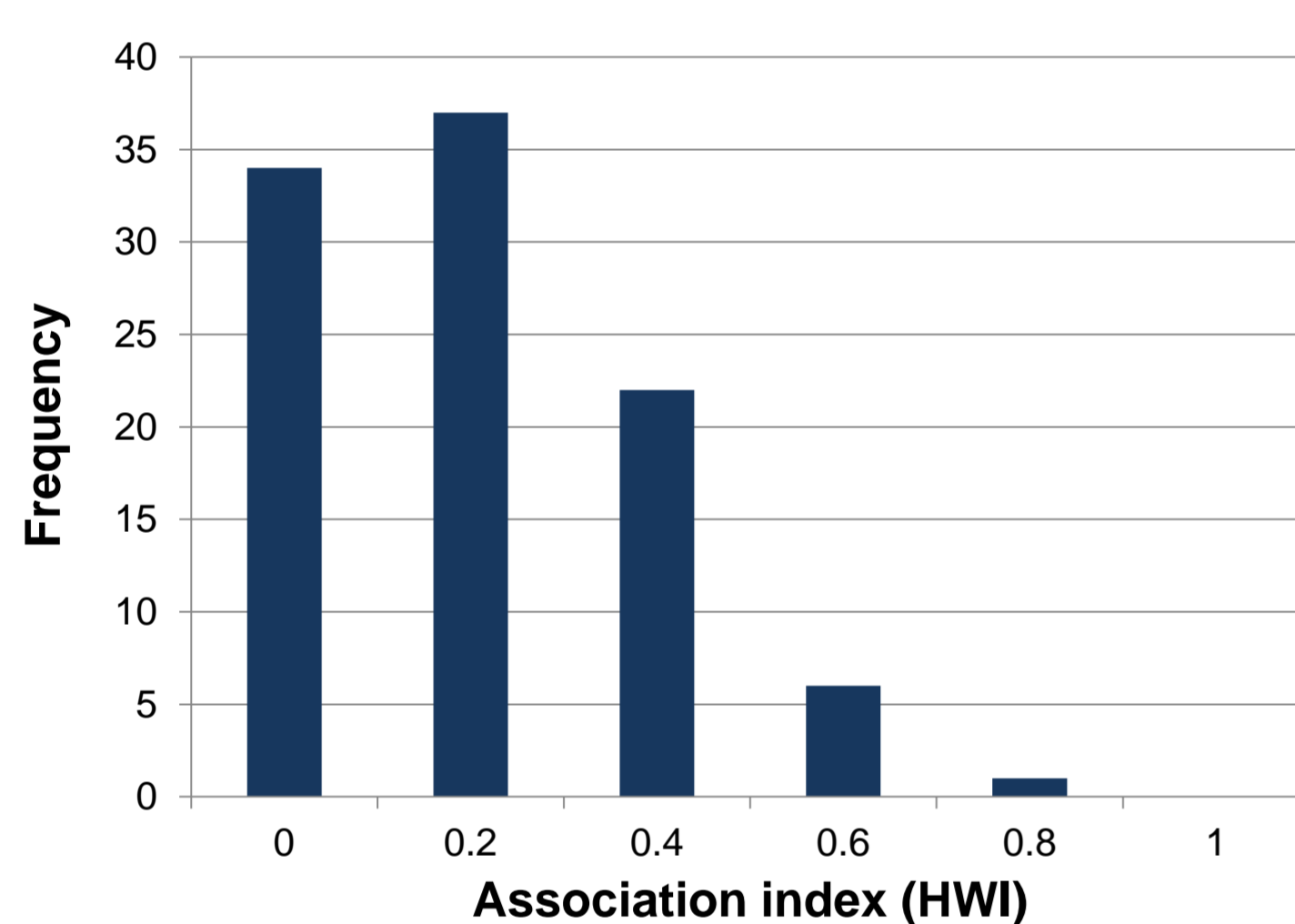


Figure 7. Frequency distribution of the mean half-weight index (HWI). Mean= 0.21 ± 0.01.

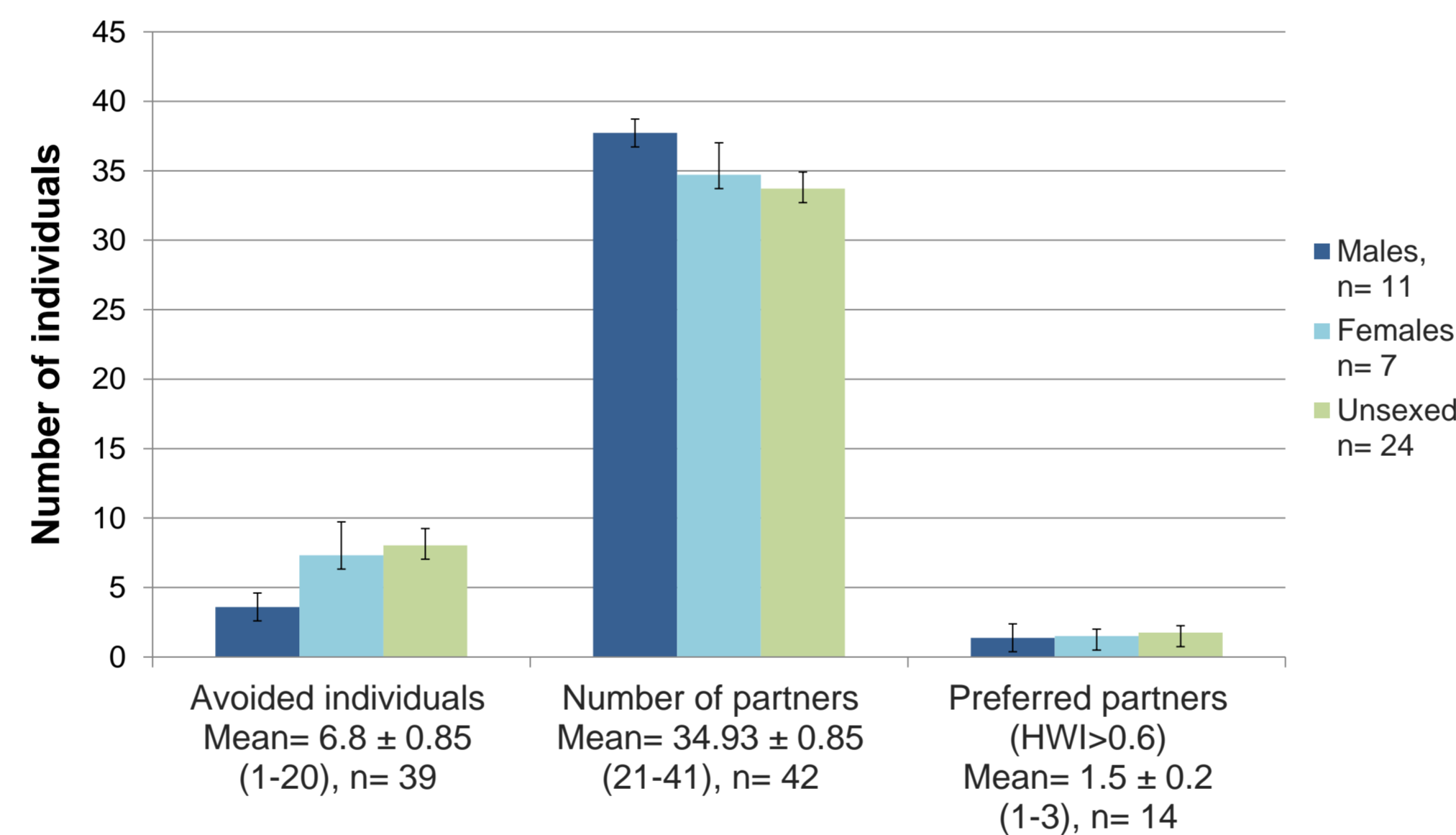


Figure 8. Mean number of associations per individuals (total, preferred and avoided). Association levels between females and males were similar (p<0.05, Mantel test with 1000 permutations).

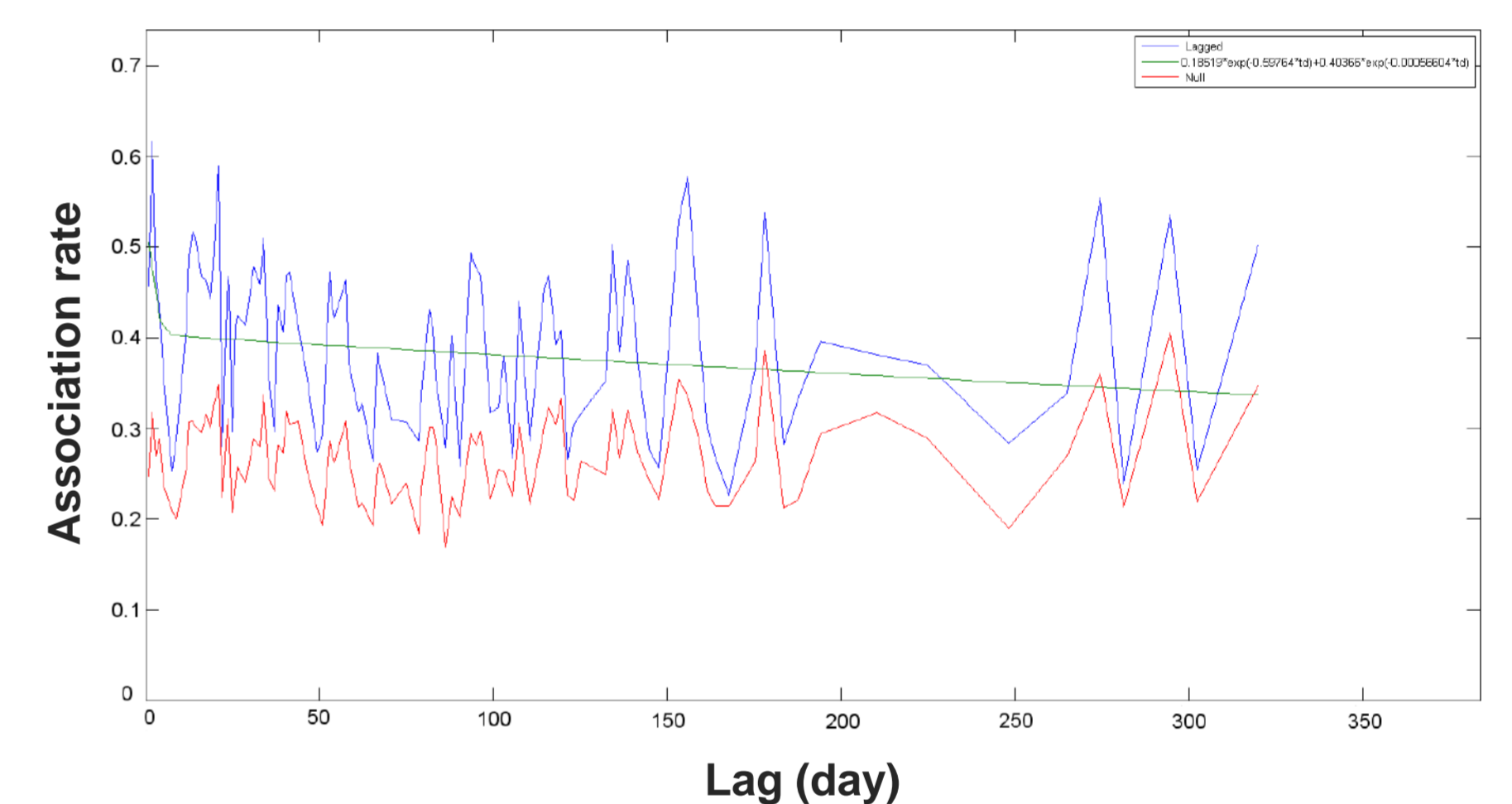


Figure 9. Lagged association rate (blue line). Null association rate (red line). The green line is the predictive model best adjusted to the data. It represents associations with rapid dissociation + two levels of casual acquaintances. Lagged association rate: 2 days.

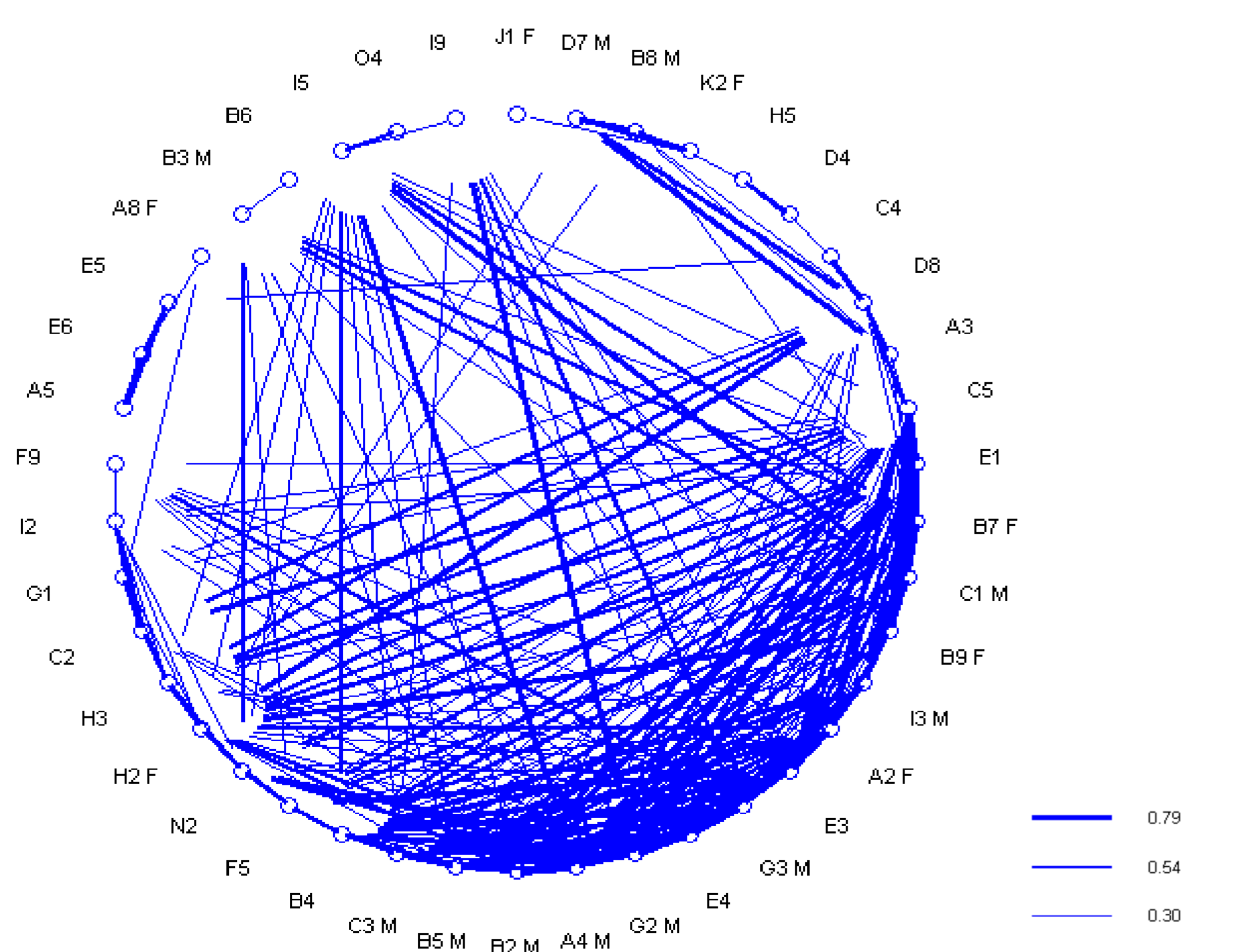


Figure 10. Sociogram showing the associations with HWIs ≥ 0.30.

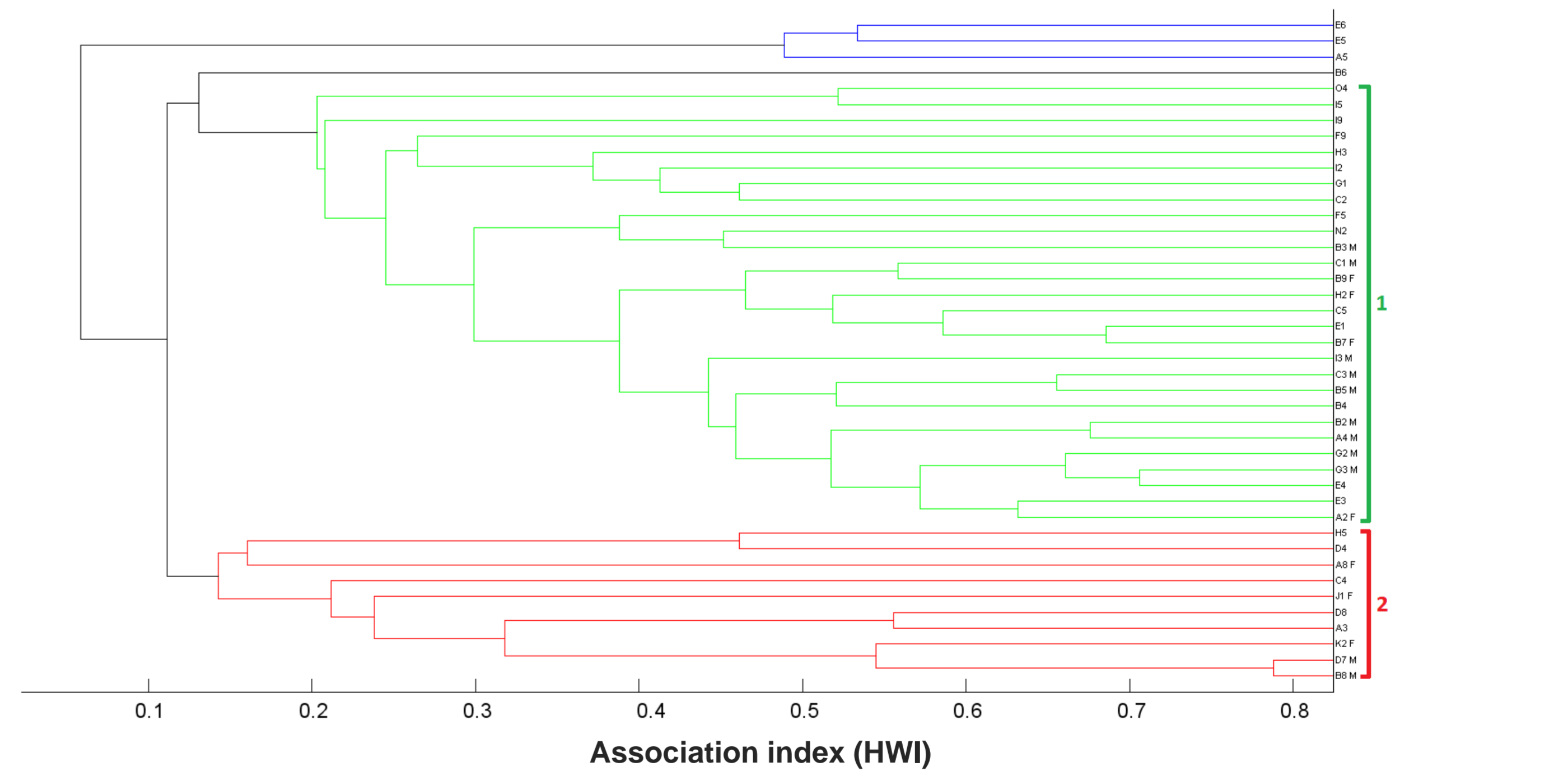


Figure 11. Hierarchical cluster showing the degree of associations between individuals (clustering using an average linkage; cophenetic correlation coefficient= 0.83; modularity 1 for gregariousness= 0.12).

CONCLUSION

- Arousa Firth's bottlenose dolphins show a clear fission-fusion society
- Some dolphins show preference for the study area
- Individuals show preferred and avoided associations
- There are fluid associations between individuals with very short association periods
- The community is divided into two clusters, but they are not isolated from each other (low modularity)
- Further research, taking into consideration the gender differences, should be done in the future

REFERENCES

- López A., Pierce G.J., Valeiras X., Santos M.B., and Guerra A. 2004. Distribution patterns of small cetaceans in Galician waters. *Journal of the Marine Biological Association of the UK* 84: 283-294.
- Whitehead H. 2009. SOCPROG programs: analyzing animal social structures. *Behavioral Ecology and Sociobiology* 63: 765-778.

