A note on sex difference in relatedness studies in relation to North Atlantic fin whales IST stock structure hypothesis IV.

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ABSTRACT

An apparently high proportion of female-female pairs in potential parent-offspring matches was reported in a relatedness study in catches of North-Atlantic fin whales from the grounds west of Iceland. This lead to a new hypothesis postulated where the males move between isolated female breeding stocks. The samples turned out to be sex biased in particular in the last year, leaving little signal in the data. Leaving out the last year reverses the sex difference. Recoveries from Discovery markings show more mobility of females on the feeding grounds. This and the exclusion of genetic difference of the breeding stocks implied by the hypothesis is found to be incompatible.

NOTE

At the last meeting Gunnlaugsson et. al (2010) reported on the sex composition of the 11 Parent-Offspring (PO) fin whale pairs detected by Skaug et al. (2008).

Numbers for Parent-Offspring relatedness matches as female (F) and male (M). Of these 2.7 are likely false positives.

F-F	F-M	M-F	M-M
6	1	1	3

Sex composition of samples by year

Year	total	females	males
1983	124	65	59
1985	158	85	73
1989	67	48	19
other	15	7	8
total	364	205	159

The sex composition of the sample in 1989 is 72% females. In other years combined 53% (157/297) are females.

All the 4 matches to 1989 (one is 1989 to 1989) are F-F. These 4 matches in 1989 are rather more than expected compared to results from other years, but one must keep in mind that PO matches in this case are most likely when samples are spaced by 4 to 6 years (ca 20% higher than same year). A skewed sex ratio therefore has a greater impact when at the extreme start or end of a sampling period. There is an excess of same sex pairs in the matches, but most of the female over representation is explained by the sex bias in the sample, in particular from 1989. When the 1989 samples are left out males are in excess.

There have been 9 Discovery-mark returns from markings outside the whaling grounds of known sex (Gunnlaugsson and Vikingsson 2008). Of these 7 are females and 2 males.

At the last meeting a new hypothesis was put forward that postulates two or more isolated feeding grounds for females, while the males move between these. It was suggested that this could skew the outcome of relatedness studies.

This new hypothesis is only of relevance in combination with the IST stock structure hypothesis IV, for which some IST trials performed suboptimally and a research programme is needed to downgrade that hypothesis. Under hypothesis VI the whales in different breeding stocks visit the feeding areas in fixed proportions each year independent of densities there.

The signal in the data, if not absent, is certainly much weaker now than apparent at the last meeting, but if this hypothesis were the case there could certainly be no genetic difference between the breeding grounds (except purely maternally transmitted). The different preferences for feeding grounds of the breeding stocks, postulated in hypothesis IV can also hardly be learned, since the animals do visit the other feeding grounds also and the calves taken there should then get different preferences. A skewed occurrence of breeding stocks on the feeding grounds could then only be due to geography and since there are no barriers it would have to be simply due to distance, such as one breeding ground closer to the WI area (farther east) and the other closer to the EG area (father west). The males would be coming from varying breeding grounds while the females were consistently coming from the same grounds. This picture contradicts the greater mobility of females seen in the Discovery-marking data.

Given no genetic difference the persistence of the mixing ratio assumed in hypothesis IV would also be hard to explain as conditions/densities change.

REFERENCES

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