month could be as high as 30% (Fig. 2).

Thus, it is now possible for the first time to identify individually and weigh migrating animals without handling them. In particular, we have learned that fledglings born to settled white storks do not necessarily migrate to Africa for three years. A network of identification sites for electronically tagged white storks could help us understand how human intervention to save endangered western European populations has changed the migration behaviour of this species.

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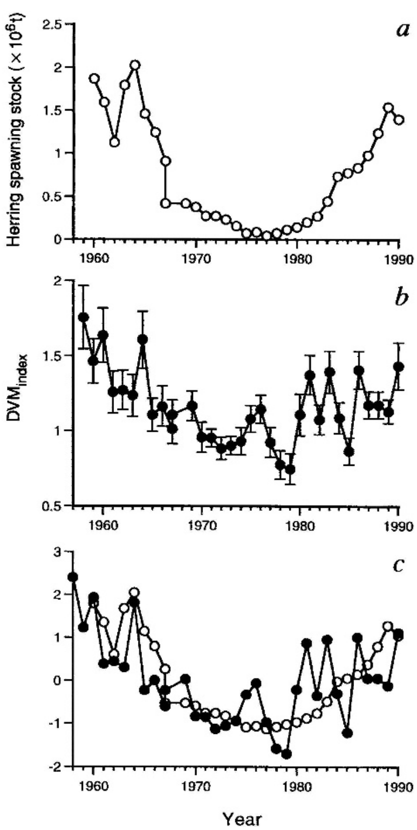
Zooplankton avoidance activity

SIR — The structure of biological communities can show systematic long-term variations, but the effect of long-term changes in the abundance of one species or trophic group on other parts of the ecosystem is often poorly understood. In the North Sea, marked changes occurred between 1960 and 1990 in the size of the herring (*Clupea harengus*) stock[1]. Data collected by the Continuous Plankton Recorder (CPR) survey[2] (CPR data were supplied by the Sir Alister Hardy Foundation for Ocean Science) show that during the same period there have been corresponding changes in the vertical migration behaviour of one the most important prey species of adult herring, the copepod *Calanus finmarchicus*, with this species spending less time near the surface in the years when herring were most abundant.

Diel vertical migration (DVM) occurs widely in zooplankton communities, with a normal pattern of deeper daytime and shallower night-time occurrence. The normal DVM may serve to reduce the risk of mortality from visual predators such as fish[3], being more marked in lakes when the abundance of planktivorous fish is high[4], inducible in experimental enclosures by the introduction of planktivorous fish[5], and, in localized areas, variable from year to year in response to variations in fish abundance[6]. Because long-term changes in fish stocks have been documented for very large geographical areas, it is conceivable that the normal DVM behaviour of zooplankton may change over correspondingly large spatial scales.

Stocks of herring in the North Sea declined from high levels in the early 1960s to low levels in the 1970s, before rising in the 1980s (*a* in the figure). Adult herring are planktivorous, with late copepodite stages of *C. finmarchicus* being a major component of their diet[7]. Using the ratio of night : day abundance near the surface as an index of the extent of normal DVM (DVM_{index}), I found that the normal DVM behaviour of copepodite stages 5–6 (C5–C6) of *C. finmarchicus* co-varied with the abundance of herring (see figure). The implication is that in those years when herring were abundant, a smaller proportion of *C. finmarchicus* occurred near the surface during the day because of the increased risk of mortality. The unexplained variation in this relationship (*c* in the figure) may have reflected the low precision with which the DVM_{index} was estimated in each year.



a, The estimated spawning stock of herring in the North Sea during 1960–90. *b*, The normal DVM behaviour of C5–C6 *C. finmarchicus* in the North Sea (54–60° N, 3 °W–10° E). For each year: DVM_{index} = antilog[mean $\log(n_{night} + 1)$ − mean $\log(n_{day} + 1)$], where n_{night} and n_{day} represent the number of specimens per sample for samples collected between midnight ± 6 h and midday ± 6 h, respectively. Error bars are ± 1 standard error. $DVM_{index} = 0.963 + 0.227$ (herring spawning-stock size in millions of tonnes), $F_{1,29} = 20.4$, $P < 0.01$, $r^2 = 0.41$. *c*, The two time series in *a* and *b* reduced to zero mean and unit variance to facilitate visual comparison.

To investigate this possibility, for various sizes of herring spawning stock randomly selected from the observed range, the DVM_{index} was predicted (using the equation given in the figure legend) and then from the observed distribution of errors (*b* in the figure) an error was randomly selected and added to each predicted DVM_{index} value. For 10,000 trials, the resulting r^2 value between the DVM_{index} and the herring spawning stock was 0.59. The observed r^2 value between these two time series (0.41) was therefore 70% of the maximum expected r^2 value given the precision with which the DVM_{index} was estimated, and hence no other factors need be invoked to explain much of the inter-annual variation in the normal DVM behaviour of *C. finmarchicus*.

These results suggest that the previously observed strong interaction between fish predation and zooplankton vertical migration in lakes and experimental enclosures also occurs on very large scales in the sea.

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Erratum

Following the publication of an exchange between Fowler *et al* and Burton *et al.* (*Nature* **375**, 366–367; 1995), Fowler *et al.* have asked us to state that the final sentence of Burton *et al.*'s second paragraph was published without first being seen by Fowler *et al.*

Scientific Correspondence

Scientific Correspondence is intended to provide a forum in which readers may raise points of a scientific character. Priority will be given to letters of fewer than 500 words and five references.