Juvenile sanderlings 2014/15

Monitoring sanderling breeding success along the East Atlantic flyway

Photo: Ageing Sanderlings in winter is certainly difficult, but not impossible. The dark mottled scapulars and greater wing coverts indicate that this is a juvenile. North Frisia, early January.

Background: Measuring reproductive success is vital for understanding dynamics in animal populations. Arctic waders represent a notorious case where breeding success is difficult to assess due to their vast distribution at both the breeding and the non-breeding grounds. For the third season now, more than 70 volunteer observers spread over large parts of the East Atlantic flyway have bundled their effort on scoring age ratios of flocks of sanderlings *Calidris alba*, a high arctic breeding wader. These data are used to get insight into the spatio-temporal patterns of juvenile proportions and eventually the annual average number of young in the flyway population – a key to assess the species' breeding success.
Here, we illustrate the migration phenology of juvenile proportions at the flyway scale and assess the juvenile proportion of the wintering population. Furthermore at two sites, the Island of Tiree (Inner Hebrides, Scotland) and the Island Fanø (West-coast of Denmark), repeated counts were exceptionally frequent allowing detailed investigations of phenology patterns on a local scale. For the first time in our monitoring scheme, juvenile proportions were determined until the end of February on Fanø, giving us a first idea about whether juvenile proportions may locally show any changes at this time of the year.

Results: Between mid June 2014 and late February 2015 a total of 294 counts were performed by 70 observers from 12 countries at 99 sites. At six sites the juvenile proportion was recorded at least five times during the survey period, which is very helpful to get reliable estimates.
The proportion of juveniles within flocks sharply increased from mid August on up to a first peak in late August/early September (~20%) after which numbers dropped slightly before a second and major peak was reached in mid September (~33%, Figure 1). After this second peak, numbers decreased towards a stable percentage from the first half of October onwards. On Fanø, however, the juvenile proportions decreased only slightly after the second peak and remained very high until early November at ~67%. Then percentage of juveniles eventually dropped sharply again and remained fluctuating between 30 and 50% until the last count in late February 2015 (Figure 1). To calculate the average juvenile proportion on the flyway scale the maximum count recorded after the 15 October for each counting site was used. The overall juvenile proportion of a large part of the flyway population was 12.8% (15 sites, 1479 individuals; see map). This is more than on Tiree, where 8% juveniles remained in the wintering population, which was identical to the previous year´s results (the percentage in 2012 and 2013).

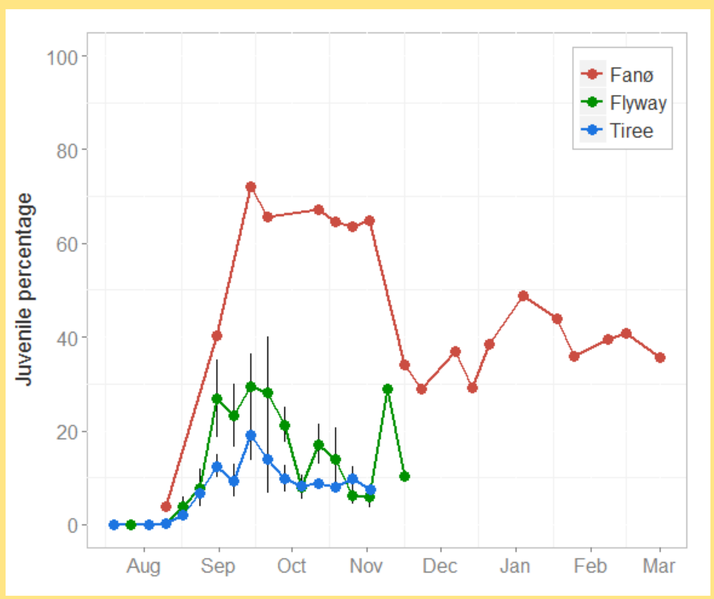
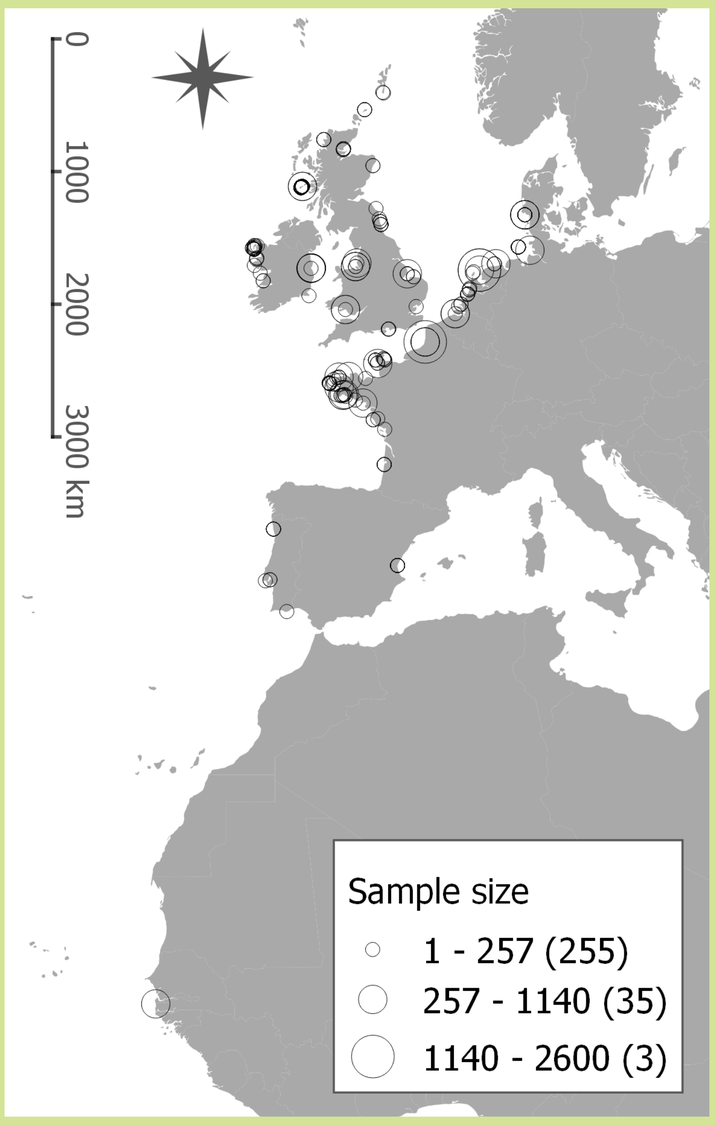
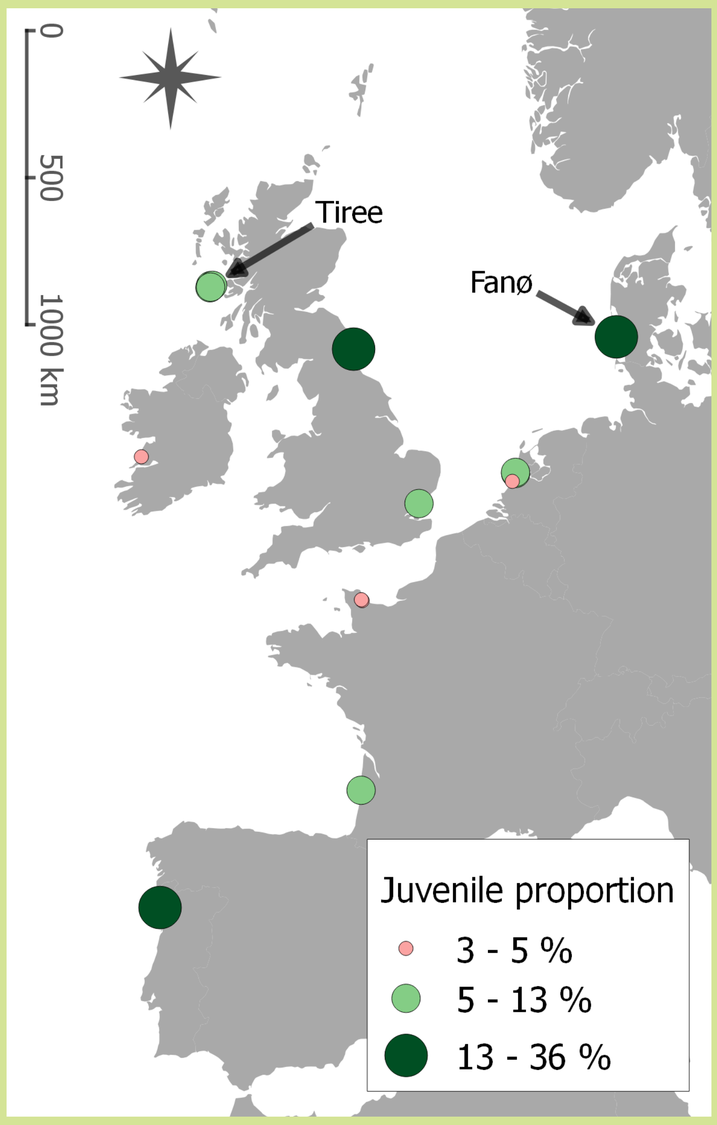


Figure 1: Phenology and variation (standard error) of juvenile percentage at different sites and scales. Sample sizes below 20 individuals were excluded from the analysis. In case of multiple counts per location and week only the maximum count was used. The flyway data plotted here do not include any data from either Tiree or Fanø.





Map: Distribution of sites and sizes of scanned (part of) flocks (left panel) as well as juvenile proportions of flocks larger than 20 individuals scanned after 5 October 2014 (right panel). In case of multiple counts per site the maximum scanned flock size was used to calculate the juvenile proportion (see also text).

Discussion: The observed peak in juvenile percentage in mid September in flocks along the flyway coincided more or less with those at the two sites (Tiree and Fanø) for which seasonal variation was assessed in detail. Overall juvenile proportions in winter in Europe was similar in the last three years of this survey (12%, 14% and 13% in 2012-2014, respectively). The question remains whether this is similar in Africa, and age scans of this continent will be very interesting. The ratio of juveniles to adults in the flocks at Fanø was considerably larger than at the average flyway, and at Tiree. This was also the case in 2013/2014 and suggests that juveniles do not randomly mix within flocks at the flyway, but that some sites (such as Fanø) hold many more juveniles than other sites. This stresses the importance of performing this survey at a large scale at as many as possible locations throughout July-November to reliably estimate annual variation in the reproductive success of sanderlings. Also, it is unknown why some sites are more favourable for juveniles than others.
For the first time, we now have reliable estimates of juvenile proportions until mid winter at one site (Fanø) – a time when ageing sanderlings is more difficult due to progressed moult (see photo). Interestingly, juvenile proportions did not remain stable but dropped in early November. This may be caused by sudden movements of juveniles out of the study area, increased mortality of juveniles compared to adults when the northern winter kicks in, and/or an influx of adult birds. The juvenile proportions at Fanø fluctuated considerably throughout the winter.We can only speculate about the cause of this pattern, but it is not unlikely that the birds used a (much) larger area than the observer could cover. The observer would then see random sub-sets of the same winter population at different dates. If this is the case, it stresses the importance to regularly scan age ratios of sanderling flocks at the same locations both during migration and winter.

*Many thanks…*to all the observers who scanned and counted Sanderling flocks! Their invaluable effort in the field and detailed recordings are the absolute key stone for this project! John Bowler and Kim Fischer gathered the unique data series from Tiree and Fanø, respectively. Christian Höfs beautifully captured the juvenile sanderling with his camera. We are looking forward continuing this project and, again, hope for many joining observers for this coming season 2015.

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