DO KNOTS TIE US UP IN KNOTS?

M.Waltner

While handling migrants, there can hardly be a ringer whose imagination does not wander. I am certainly no exception. All sorts of ideas go through one's mind. The question 'where from?' is the one most often asked. The long ringing nights provide ample time to discuss old theories and speculate on new ones. But what about the reality?

The northern spring of 1985 saw an internationally co-ordinated probe into migration along the east Atlantic flyway. Much effort was put into it. Expeditions went as far as Mauritania and northern Norway and some work was done in Iceland. The Western Cape Wader Study Group (WCWSG) contributed their share by monitoring departure dates and ringing target species, especially the Knot *Calidris canutus*. At Langebaan this species seems to be much more regular and occurs in larger numbers than it did 20 years ago. This alone already justified our curiosity and the earlier mentioned question. So let us look at some of the ideas in the hope of finding the answer.

Breeding range:

It is best to start off by looking at the known breeding range of a species. Our answer would be simple if the Knot bred only in a relatively small area of the globe, as does the Curlew Sandpiper *Calidris ferruginea*. However, migrants with a wider or even circumpolar distribution make life more difficult. Some, like the Sanderling *Calidris alba*, are uniform in size and plumage over their whole range and, therefore, give us no clue as to which population they belong. Others show geographical variation, and the species are then subdivided, often only on slight differences. Knots fall within the latter category. Circumpolar in their distribution, four subspecies are recognized and a large, poorly known area in Alaska may well provide a fifth (Figure 1 overleaf). From the South African point of view, two races are of special interest: *islandica* and nominate *canutus*. However, if we consider that one South African-ringed wader has been recovered as far east as 164° longitude, then the possibility of the subspecies *rogersi* reaching us must not be disregarded. Siberian breeding localities are poorly documented and very little is known about *rogersi*.

Ringing recoveries:

Obviously most rewarding and justifying from the ringer's point of view would be a number of controls or recoveries. The

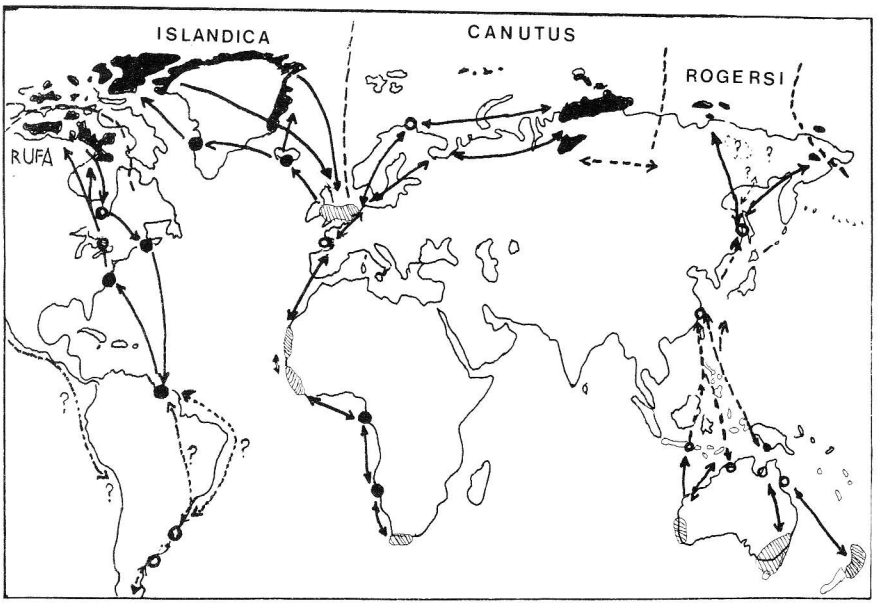


FIGURE 1

DISTRIBUTION MAP OF KNOT *Calidris canutus*

BLACK:	BREEDING AREA.
HATCHED:	WINTER QUARTERS.
● O	KNOWN AND PROBABLE STOPOVER AREAS.
SOLID ARROWS:	KNOWN MIGRATION ROUTES.
BROKEN ARROWS:	POSSIBLE MIGRATION ROUTES.

(Taken from ROSELAAR, 1983)

origin of European Swallows *Hirundo rustica*, which overwinter in South Africa, is well documented on account of this. No such luck with our Knots. Despite a satisfactory number of recoveries north of the equator, none so far has given us a positive indication of their final destination. Not surprising if one considers the remoteness of the area. Starting from Mauritania, recoveries lead us along the east Atlantic coastline as far as the Baltic Sea and southern Norway. From there birds could head either west to Greenland or east towards Siberia. At this point a comparison with the Curlew Sandpiper may be of interest. Although it is generally assumed that the two species share the same breeding grounds, they certainly do not approach them along the same migration routes. In the latter species, the bulk of the recoveries have been reported from between the longitudes of Italy and the Caspian Sea. Surely it would be reasonable to expect that recoveries of the larger and

more conspicuous Knot would have been made in this region by now, if migration strategies are similar. However, no ring-related information for the Knot has ever been reported away from the east Atlantic flyway.

Plumage:

Having failed so far with our answer, we now try to find out if the Knots at Langebaan can be assigned to one of the subspecies. In the Knot, as in many other waders, the plumage difference is restricted to the nuptial dress. Unfortunately the description of *islandica* and nominate *canutus*, the two subspecies most likely to reach South Africa, are very similar. Differences like 'rufous less deep, more yellow and black marks narrower' are of little use in the field where no comparison is possible. Add the variation within the population, the difference between sexes, a little feather wear, and you end up in confusion. With regard to feather wear, we have a stroke of luck. By the middle of April, many adult Knots display a near complete breeding plumage. So, if we could get some good skins from known breeding areas for comparison, it should be easy. Many times we have held several live Knots in breeding plumage next to each other but never could we point with confidence to any differences. The general appearance of the nominate race is darker than that of *islandica*, and within each subspecies the upperparts of the females are usually darker than those of the males. Theoretically, therefore, the general appearance of a male bird belonging to the nominate race would be similar to the female of *islandica*. In spite of this I am convinced that a detailed and systematic recording of plumage will go a long way towards answering our initial question. This means less ringing and more writing.

Biometric data:

Differences in measurements are important criteria to distinguish subspecies, especially if the differences can be linked to specific areas. Bill and wing length are the characters most commonly used in waders. Of these two, bill length is the more reliable. In Knots, the average bill length of the nominate race is about 2 mm longer than the bill of the populations adjacent on either side. Considering variations within the population and the fact that females generally have longer bills than males, it would be presumptuous to classify individual birds on this measurement alone. For instance, the bill length of a male belonging to the nominate race could fall well within the measurements of females of either *islandica* or *rogersi*. There is a similar overlap in wing length; wing length, however, decreases from west to east. Luckily bill and wing length show different trends. By combining both parameters, we could then talk about shortbilled/longwinged *islandica*, longbilled/mediumwinged nominate *canutus* and shortbilled/shortwinged *rogersi*, all of which could land up in our nets.

Roselaar (1983), studying taxonomy and plumages of waders, realised this. He plotted the measurements of Knots wintering in the Netherlands and Knots migrating through the area and found very little overlap. These different populations were well separated and are thought to represent birds from Greenland and Siberia respectively. In South Africa migrant waders are assumed to be mostly of eastern origin and one would, therefore, expect that measurements would fit above the dividing line in Figure 2, which shows all Knots caught during March and April 1985. Readers are invited to draw their own conclusions. However, during that season, Knots at Langebaan were not the only ones which did not match expectations. Intriguing ringing recoveries from France and biometric data of Knots trapped in northern Norway took everybody by surprise. So much so that the international wader migration study will be repeated next spring. But back to Langebaan and Figure 2. Is it coincidence that all but one of the young birds (open circles), fall above the dividing line? A genuine difference would support a theory of two populations being present, especially if it can be established that *islandica* had a poor breeding season. But do we know whether young birds of the Greenland population do come as far south as the nominate race?

Moult:

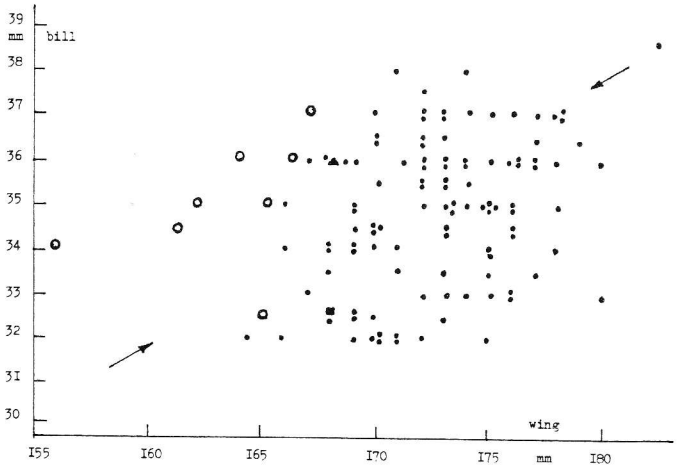
The timing and strategy of moult is another avenue worth investigating, as differences could be used to support other evidence. No comparison between birds wintering in Europe and South Africa can be made. The different climatic conditions would release a different response. All Knots arrive in South Africa without having started to moult their primaries. All adult Knots replace their flight feathers in the same sequence. This cannot be said for first-year birds; here we observed two strategies, a normal and a partial moult. Linking this to the biometric data of the individual bird could prove to be a worthwhile exercise.

Timing of migration:

The timing of migration, together with biometric data, were criteria used in separating the western and eastern populations of the Knot in Europe. However, at Langebaan we are dealing with sedentary wintering populations and, therefore, need a different approach. Two questions come to the fore. Would different subspecies form their own communities within the lagoon and would they migrate north at the same time, bearing in mind that their destinations lie far apart?

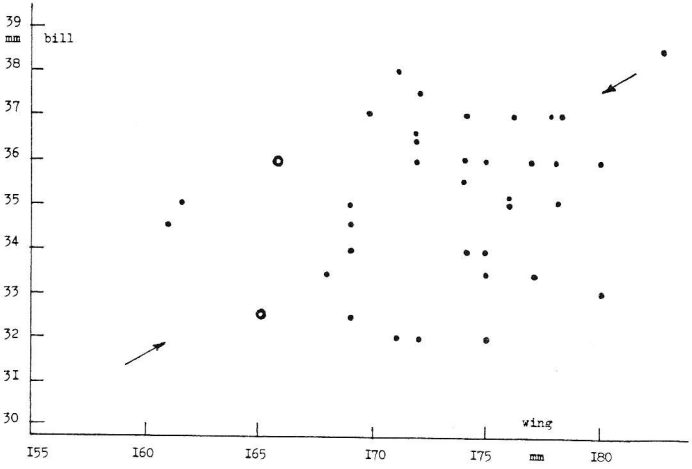
The WCWSG have never managed to trap sufficient Knots to tackle the first question. However, we do have some experience with the Sanderling. Colour-marked individuals of this species suggest that there was no movement between the major roosts. From ringing controls we know that Sanderlings not only return

FIGURE 2



WING AND BILL LENGTH OF KNOT *Calidris canutus*, TRAPPED DURING MARCH AND APRIL 1985 AT LANGEBAAN, SOUTH AFRICA

FIGURE 3



WING AND BILL LENGTH OF KNOT *Calidris canutus* TRAPPED ON 26.04.1985 AT LANGEBAAN, SOUTH AFRICA.

(Legend for Figures 2 & 3)

DOTS: ADULTS WITH NEW PRIMARIES.
OPEN CIRCLE: FIRST-YEAR BIRDS.
SOLID SQUARE: CONTROL, RINGED IN BRITAIN
SOLID TRIANGLE: CONTROL, RINGED IN NORWAY.

(ROSELAAR, 1983, proposed that the line between the arrows separates most birds of the Greenland and Siberian populations)

to the same wetland but they also return to a particular section of it. Because the Sanderling does not exhibit geographic variation this cannot be linked to different populations. This is unfortunate, as the migration system of the Sanderling shows two different routes, correlating with those of the Knot and Curlew Sandpiper respectively. It may well be that we are dealing with populations whose breeding areas lie far apart.

A special effort was made to answer the second question. Six weeks prior to departure, major Knot areas at Langebaan were visited at weekly intervals. No locality was vacated prior to the last departure date, but the number of birds present fluctuated. A valuable catch of Knots at a night roost was made only days before the last adult birds were seen. Data taken from this catch suggested that both shortbilled/longwinged and longbilled/mediumwinged birds were present (Figure 3). So at least for the year 1985 we are able to state that there was no apparent difference in departure dates.

To what conclusions do we come? Do Knots really tie us up in knots? We certainly are not where we want to be, but at least we know now how to get there. Given two seasons with reasonable catches and continued international co-operation, we should then be able to give a firm answer to our initial question.

ACKNOWLEDGEMENTS

I thank all members of the WCWSG for stimulating discussions and generally keeping me company during the long ringing nights. I am grateful to Les Underhill and David Whitelaw who helped me with this article.

REFERENCE:

Roselaar, C.S. 1983. Subspecies recognition in Knot *Calidris canutus* and occurrence of races in Western Europe. Beaufortia 33: 97-109.

M. Waltner, 5 Montague Way, PINELANDS, 7405

- o O o -