COMMENT: Stomach fushing regurgitated

All techniques that have been used to assess wader diets have advantages and disadvantages. None has been totally successful and it is only by using a combination of methods that a reasonably comprehensive picture can be obtained. the stomach flushing method we describe (Martin & Hockey 1993, *Wader Study Group Bull.* 67: 79-80) attempted to bring an additional technique , widely used in dietary studies of other avian groups, particularly seabirds (Ryan & Jackson 1986, *Auk* 103: 427-428), to the attention of wader researchers.

As stated in our study (*op. cit.*), the method was used to complement a much more detailed dietary study of birds at the Swartkops estuary which relied primarily on direct observation. Stomach-flushing has the same drawbacks as traditional stomach analysis, except that the bird is not killed but it does have to be caught.

In our study, stomach-flushing provided the following information which we could not obtain by direct observation.

1. Identify of small prey items to species level. In particular, we were able to assess the relative importance of three small crab species and two small gastropods in the diet and were able to identify insect prey to family level.

2. Additional food types were recorded which could not have been recorded during low-tide observations alone: these included non-estuarine prey and the fruits of saltmarsh plants.

3. Because the birds were mist-netted on their foraging not roosting sites, many prey specimens were sufficiently intact to be measured directly. This provided comparisons with field estimates of prey size and was thus the only method by which we were able to determine the sizes of small prey.

Verkuil advocates the use of faecal analysis for diet reconstruction. In the early stages of our study we did collect and analyse droppings. However, because mudprawns *Upogebia africana* accounted for more than 90% of the dry mass of prey consumed by most species, the only identifiable prey remains were minute fragments of mudprawn and a few fragments of crab carapace. Nothing was sufficiently intact or identifiable to be related back to original prey size and this technique was thus clearly of little use in our situation.

Another problem with faecal analysis (and regurgitated pellets) collected in the field is that to be sure of the species involved, the item has to be collected as soon as the 'owner' has been observed producing it. This has two drawbacks. Firstly it is time consuming and secondly it disturbs the birds, hindering further observation.

The problem is particularly acute in tropical situations where wader assemblages are less numerically skewed towards one or a few common species than they are at temperate latitudes. Faeces certainly can be collected during ringing operations, but this negates the main advantage of the technique, namely that it is not essential to catch the bird. It also means that birds may have to be held captive for longer than is normally the case.

In conclusion, there is still no one method of dietary analysis that will provide all the answers and to advocate one technique as being universally better than another is unrealistic. Unfortunately, Verkuil's paper contains no explicit test of her implicit (and accepted) hypothesis. Some techniques have advantages over others depending on the circumstances and, importantly, the prey species involved. Stomach-flushing remains a useful a useful technique for obtaining mainly qualitative diet data during routine ringing operations. As with all potentially stressful procedures (such as running after waders with a 'poop-scoop'), it should be used only if there is a sound reason for doing so.

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