

Assessing avian parasite infections from faecal samples: the old methods are still the best.

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Unseen and ignored by most ornithologists, large numbers of parasites live inside birds, with pathological consequences ranging from negligible to severe. In order to explore the diversity of intestinal parasites in NZ birds using a non-destructive approach, three methods for the detection and counts of parasite eggs in faecal samples were assessed. We tested the efficacy of a novel egg flotation device and counting method compared with a classical faecal egg count method, the McMaster slide, and also with a “total float” approach that examines in detail all, or almost all, of the faecal sample.

We collected faeces from individual birds, at four freshwater sites. Species sampled included mallard, scaup, pied stilt, feral goose, black swan, little pied shag, paradise shelduck, South Island pied oystercatcher and variable oystercatcher. In addition, as a control, we dissected the intestines of two mallard ducks and compared the known intestinal parasite load with the content of the faeces taken directly from the cloaca.

Using the commercial egg flotation and counting device we were unable to discern or identify a single parasite egg, even when parasites were known to be present. This was because: 1) the eggs most likely to be found in our bird species were considerably smaller than those for which the device was designed to detect (i.e. sheep and cattle nematodes), and 2) because they are in low numbers and therefore were not found in the minimal subsample used in the device. McMaster slides fared little better, only showing up a small fraction of the parasite eggs known to be present, and missing the rare specimens. By far the best, and ultimately the only way to assess the faecal samples with any reliability was to examine all, or almost all, of the sample by the “total float” method. This concentrates the parasite eggs from the entire faecal sample in the meniscus of water at the top of a testtube and enables visualisation of the eggs that float to the surface. Using this method we were able to enumerate several different types of eggs, some of which were identifiable to family level. Extracting each type of egg and sequencing DNA from them would be a logical step to further identify what intestinal parasites these birds are harbouring.

The results of this trial have contributed some preliminary knowledge on the worms found in some water birds, as well as finding that the old-fashioned, labour-intensive method of faecal egg examination remains the only reliable one. Further, parasites and diseases are largely ignored in traditional ornithological research, despite their obvious importance to the well being of birds in the wild, so the research is an important complement to other past and present research projects on NZ birds. Our findings will ensure that, if faecal egg counts are used for assaying parasite load in the future, a thorough approach will be taken. Collecting faecal samples and performing a “total float” assay is a simple procedure that could be utilised by any interested ornithologist who has access to a microscope. The work has produced new information on the parasites of a number of bird species from specific South Island populations that may prove valuable for conservation and management purposes, and for bird welfare. It shows that faecal egg assays would be useful for checking for parasite pathogens in cases of mass sickness.

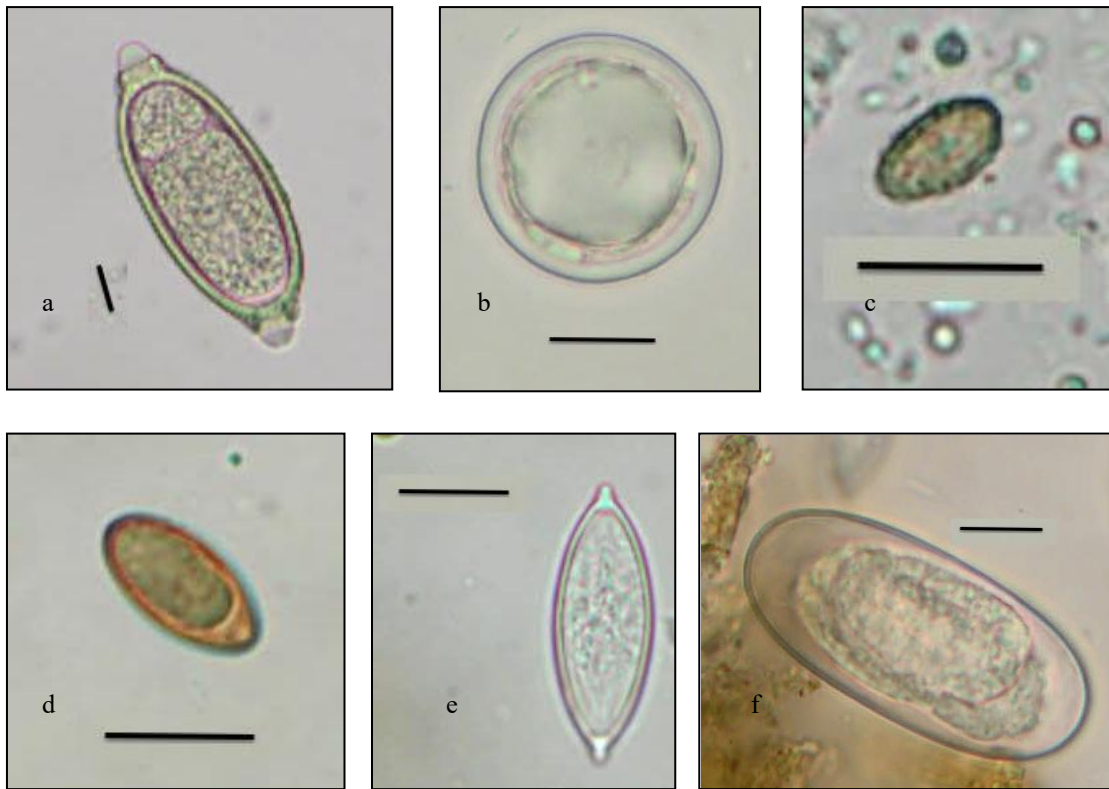


Figure 1: A selection of parasite eggs from the faeces of a pied stilt: a) *Capillaria* sp. [nematode]; b) unknown round egg or cyst with thick 'shell'; c) ascarid egg [nematode]; d) unknown pigmented trematode egg; e) unknown egg(?) found in large aggregations; f) embryonated spirurid egg [nematode]. Scale bar = 10 μ m