# RUFFNET: A RINGING STUDY OF PLUMAGE AND BEHAVIOURAL POLYMORPHISMS IN RUFF

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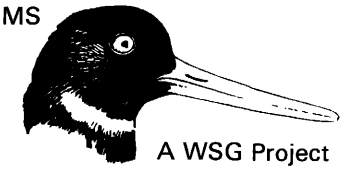



## INTRODUCTION

Resident and satellite male Ruff *Philomachus pugnax* may have different life-history patterns. If ringers record the plumage patterns of males captured in the spring or summer, we can determine: 1) whether the two morphs migrate at different times within a season, 2) whether the two morphs first migrate and attempt to breed at the same age, and 3) whether the two morphs have similar annual survival.

## THE QUESTION: WHAT ARE THE CONSEQUENCES OF POLYMORPHISM IN MALE RUFF?

Ruff males vary widely in the colour and pattern of their breeding plumages, and have a plumage-correlated dichotomy in their mating behavior at leks. "Resident" males, which generally have dark plumages, defend small display courts or "residencies" on the lek or "arena". Adult males with light plumages, called "satellites", are non-aggressive at leks, and may be tolerated by residents and share their display courts with them (Hogan-Warburg 1966). Both types of males mate with females at the leks. Individual males do not change plumage coloration from year to year (Andersen 1951), and rarely, if ever, change behavioral role.

This plumage and behavioral variation, unique among birds, is widely believed to be due to genetic polymorphism (Hogan-Warburg 1966, van Rhijn 1973, 1983). If this is so, morph ratios should be determined by the long-term reproductive success of each form. However this does not require that the average *annual* success of males of each morph be equal. It is also possible that morphs have different life-history strategies with equivalent individual fitness. Males of one morph may consistently have a lower annual mating success, but a higher year-to-year survival rate. For example, satellite males appear to have a lower-cost breeding tactic, which might increase their survival during the breeding season. Since they need not establish courts, it might not be necessary for them to arrive as early in spring as resident males. This might decrease their vulnerability during poor early spring weather. Satellites also avoid spending time, energy, and taking the risks associated with establishing and maintaining display courts. On the other hand, one might argue that the more conspicuous white plumages of most satellites make them more likely targets for predators, which would decrease their survival during the breeding season relative to that of resident males.

Several recent hypotheses about the possible adaptive significance of the Ruff plumage polymorphism predict that clines in morph frequencies exist (van Rhijn 1983, 1985). It is difficult to assess the existence of clines since workers have classified males using different sustems at different sites.

## A METHOD FOR STUDYING MORPH DIFFERENCES

Ringing studies provide the best method for assessing whether resident and satellite morphs differ in annual survival and age of first-breeding. Ringing data also may be used to look for differences in the timing of migration and geographical distribution. Key questions may be answered if ringers record the plumage descriptions of males that they capture in the spring or summer, when plumages are developed enough to be identified (April-June in most parts of Europe). We have devised coding sheets and ringing forms that provide a uniform system for classifying the ruff and head-tuft plumages of male Ruffs caught by ringers, and criteria that may be used for aging males. Using this information, we will be able to compare the migration timing and survival of different morphs..

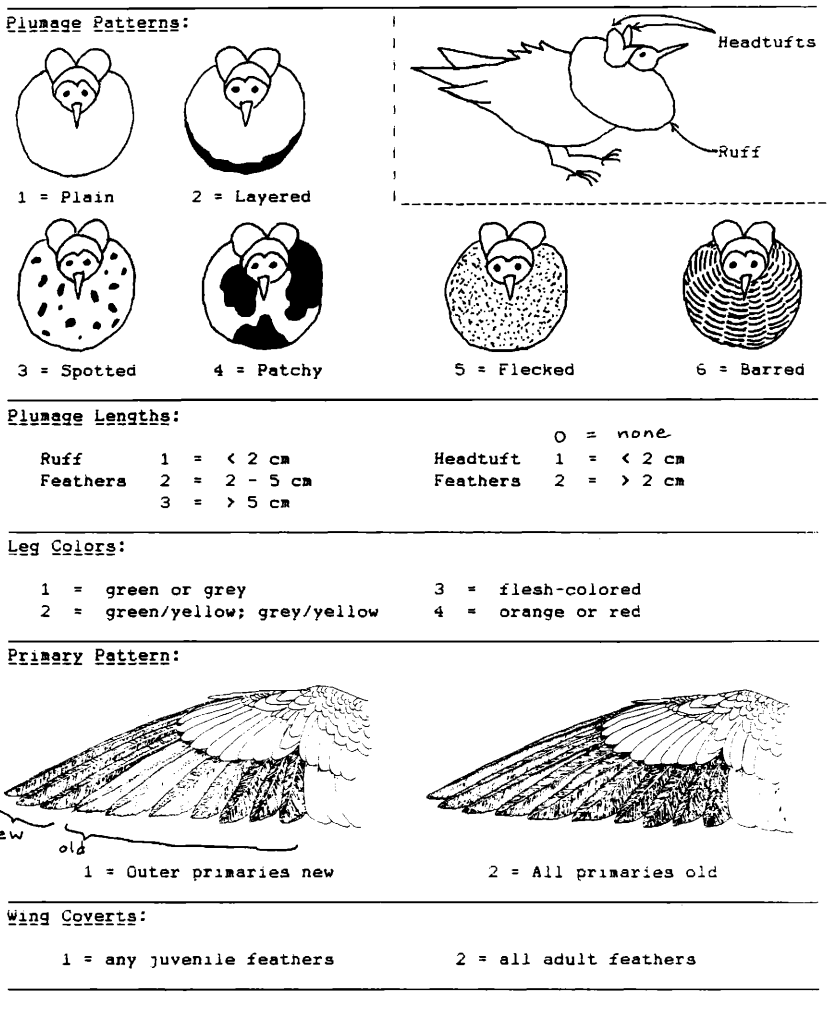
There are numerous difficulties associated with generating accurate survival estimates from ringing data. However nearly all of these problems are irrelevant to the question being posed here, namely, what is the *relative* survivorship of the two morphs. A simple comparison of the recovery distributions of the two morphs as a function of years since ringing will suffice. The most crucial potential confounding factor to the survival analysis would be if the morphs differ in their age of first migration north. This would alter the average age at ringing of the two morphs, and affect the survival analysis. If ringers are able to identify first-year males, using age criteria provided (c.f. Drenckhahn 1968; Glutz *et al.* 1975; Prater *et al.* 1977), we will be able to determine whether the morph ratios of first-year males are different from the morph ratios of older males, suggesting differential first migration, and perform an analysis on known-age birds only.

## A PROPOSED *MODUS OPERANDI*

We encourage anyone who may be able to ring Ruffs between March and June, when nuptial plumage can be determined, to obtain coding sheets, a page of annotations explaining the coding, and sample data sheets from either David Lank or Theunis Piersma, at the addresses below.

We will collate and analyse the ringing and recovery data as it accumulates over the years to come. We can expect up to a 2-4% recovery rate for male Ruffs banded in Europe (Saurola 1977, Scheufler & Stiefel 1985). While the seasonal timing of migration and the age of first migration will be readily determined, it will take some years to accumulate data on survival. Anyone interested in helping with the analysis and presentation of results would be welcome to do so.

Part of the Ruffnet Coding Information

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