

Ruff research in The Netherlands (Southwest Fryslân)



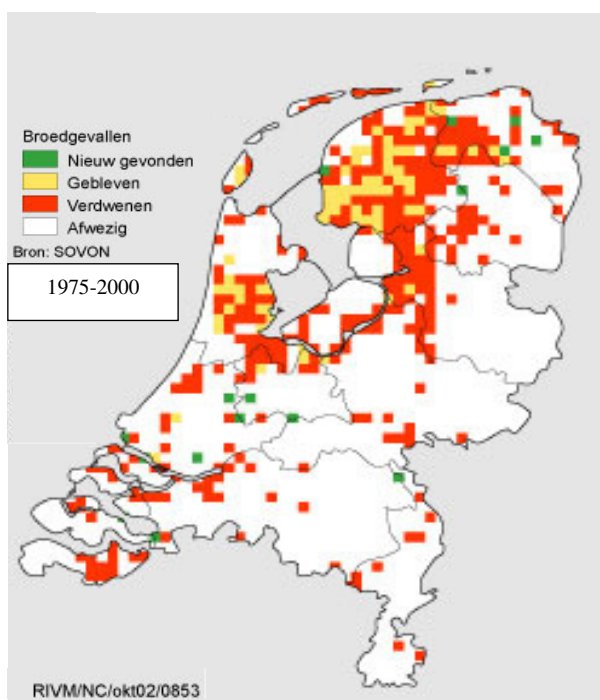
RUG

Newsletter 2004

Background of our research on Ruffs

The Ruff is a globally unique wader species. For sure it is the most extravagant wader, both in appearance, sexual dimorphism, and in their elaborate lekking behaviour. In spring males show off with large ruffs and tufts, whose striking colours and patterns are highly variable and individually unique. On the lekking sites, males perform displays, including ritual fights; the much smaller females visit these leks and choose an attractive mate. Males are not involved in the breeding phase. Ruffs breed throughout Eurasia and winter mostly in southern Europe and on the African continent. Over its range it is one of the most numerous wader species.

Only recently Ruffs have disappeared as a common breeding bird in the Dutch meadows and grasslands, and are now almost extinct now in most of western Europe (except Scandinavia). Migrating birds are still very common though in our region. A significant part of the world population migrates via the Netherlands, connecting the Dutch meadows with various northern breeding areas, which as ringing recoveries have revealed, range from Scandinavia to Eastern Siberia. Also during autumn many individuals make a migratory stopover in the Netherlands, although in lower concentrations than in spring. Small numbers winter in the southern part of the Netherlands and in Belgium, but most migrate to wetlands in south-western Europe or to the African swamps. Apparently, the Netherlands seem to be important chain in the life cycle of the Ruff.

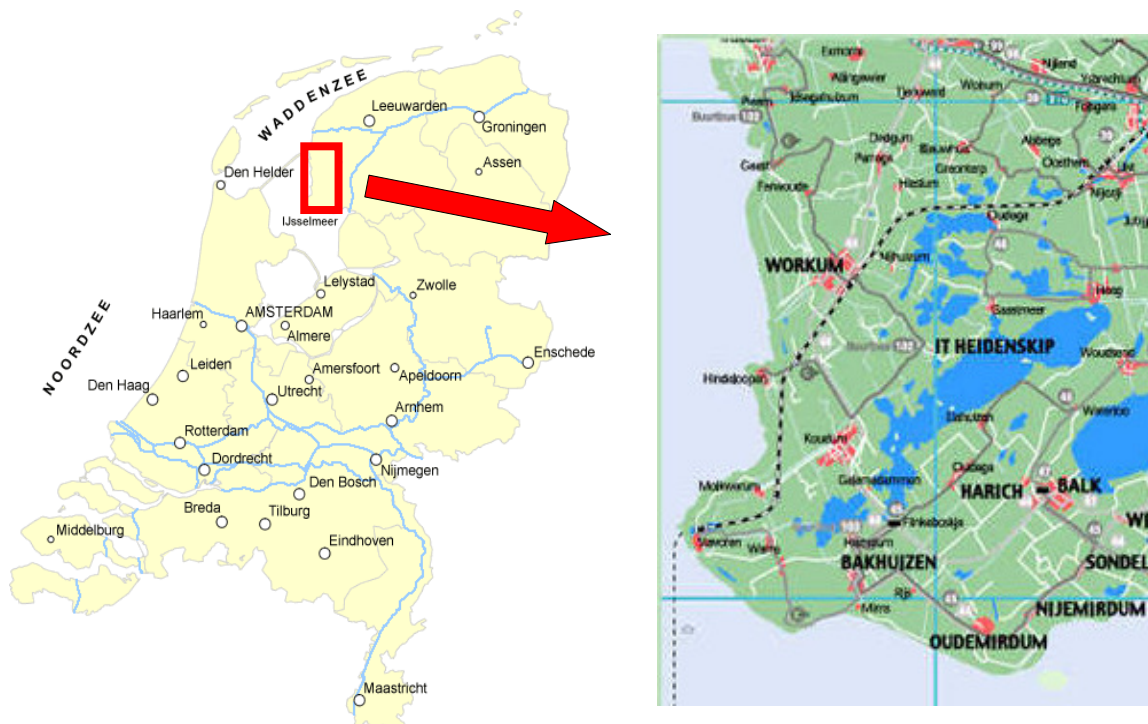


Ruffs are "culture followers". Which means that they spend the major part of their lives in man-made habitats, such as rice fields in winter quarters or agricultural grasslands during breeding and migration. Being culture followers, they first took profit of the increasing intensification of agriculture. Due to better drainage and fertilisation larger and richer breeding habitats became available. Recently, however, the intensification, became so effective that the extent of wet, herb-rich grasslands, with a late mowing and extensive grazing regime has started to decrease and as a consequence at many sites in Western Europe (including the Netherlands) the preferred habitat of Ruffs has disappeared. Locally this has resulted in a strong decrease in numbers of breeding birds.

The attractive lekking behaviour of Ruffs has been intensively studied over the last decades. Our knowledge of the rest of their life cycle is, however, limited. Several million Ruffs winter in Africa, but how many of these birds migrate through the Netherlands is unknown as are the flyways and breeding sites that they use. It is even possible that several subspecies of Ruffs may exist, as is the case in many other wader species with equally large distributions. The decrease in numbers recorded at many breeding sites is usually attributed to local habitat loss, but other factors such as dehydration on wintering sites in Africa, hunting and habitat quality loss at both wintering and migratory stopover sites could also play a role. For example, better harvesting techniques in rice fields leads to less spillage of grains, what may lead to lower food availability for birds feeding on these spills. And how about the habitat availability and feeding conditions for Ruffs making a stopover in the Netherlands? In our region there is an increasing trend among farmers to gain more and more income through the natural value of their land. Supporting this development, good knowledge on grassland maintenance and local management favouring birds can be of crucial. For breeding Black-tailed Godwits and for wintering geese this is already an ongoing practice, but for the migrating Ruffs this is still bare terrain. Hopefully, our research can contribute to making the Ruff not only a key species in agricultural management as a breeding bird but also as a migratory bird!

In spring several ten-thousands of Ruffs occur in the grasslands of Southwest Fryslân, mostly between March and the first half of May. During this stopover birds refuel (both fat and proteins) for the next flight and males moult rapidly into to their elaborate breeding plumage. The presence of large numbers of Ruffs, during a prolonged period during an important phase in the annual cycle offers unique opportunities to study this interesting species. For this and other reasons the University of Groningen has started an intensive research program in 2003.

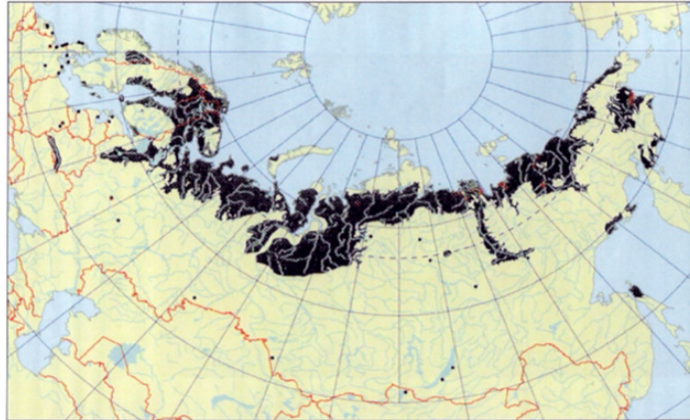
Study area for our Ruff research



Research questions

In 2003 we started collecting data which could help us answer questions about origin, migratory flyways, connectivity between staging sites and population size of Ruffs:

- (1) We initiated a **colour ring program**; Ruffs are banded with an unique colouring combination of four rings and one flag (see scheme at the very end). The first results have already been used to estimate the numbers of Ruffs using Southwest Fryslân during migration (see below). In the future we want to improve these estimates; then we will also be able to calculate the yearly survival on an individual basis.
- (2) The numerous **resightings of colourringed birds** have already provided insights into where our birds breed (see below). Molecular markers (see below) will enable us in the next few years to assign the breeding origin of many individuals caught in our study area or to assess their wintering quarters. For this purpose we also want to use feather isotopes analyses. Information about where a bird eats and feeds is stored as feather isotopes from the different diet components used to grow feathers. Isotopic profiles of feathers are expected to vary between specific moulting areas.
- (3) We are using **molecular markers** to study possible population subdivision over the vast range of breeding areas. We use DNA isolated from small blood samples collected from each colourringed individual. This genetic population study will also enable use to estimate numbers of Ruffs in the past (e.g. during or just after ice ages). Analyses in the laboratory are underway.
- (4) By **monitoring "meadow use"** we want to gain insight in what aspects of Fryslân and its relatively wet grasslands are attractive to Ruffs. Observations on foraging Ruffs will shed light on the apparent differences in the ecology of males and females (see below).



Breeding area of Ruffs

Ringing research

Our ringing research is totally dependent on the ongoing collaboration with traditional birdcatchers, the "Fryske wilster-netters". They catch various wader species with the aid of a clapping net, whistling sounds and handmade decoys. This ages-old catching method was in the past predominantly applied by farm workers to earn an (extra) living, but currently the method is only allowed when supporting scientific research. Next to "Wilsters" (the Frisian word for Golden Plover) many Ruffs are caught. All birds are ringed, weighed and measured by the wilsternetter, after which he gives us a cellphone call. When we arrive at the catching site we apply the birds with an



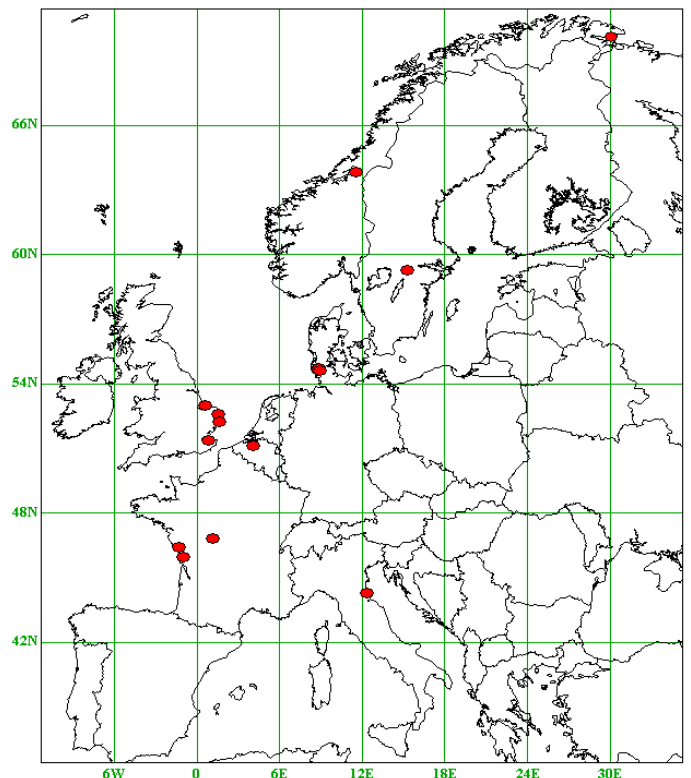
"Wilster"net in action

unique colouring combination. In this way we are able to ring much more birds than if we would had to catch them all by ourselves.

The colour combinations enables us to recognise individual birds from a large distance. In 2004, we have colour-ringed 1134 birds in total. As many as 26% were resighted before the end of May, mostly within the study area. Based on these resightings we can calculate the average staging time of an individual bird and then estimate the total number of birds that made an stopover in our study area. These calculations were carried out with a sophisticated computer program called MARK. While our first results are considered still preliminary, the data show an average staging time of 27 days, and indicate that possibly as many as 70.000 birds use our study area. These same figures will also enable use to assess differences in staging time between males and females. An interesting aspect is that the population, migrating through our study consists predominantly of males in early spring. Later on, by the end of April the proportion females increases to about 50% in the second week of April. On first sight many more males seem to be present in the area, but if females would stopover for shorter periods and thus have an higher turnover rate than the males, the numbers of males and females migrating trough Southwest Fryslân could even be equal. In the next few years we hope to fill this gap in our knowledge.

The resightings

In 2004 we received reports of as many as 500 resightings from all over (north)western Europe. At first, most resightings were birds seen by us or others within the study area and within days or weeks after catching. But soon the first birds were reported from other localities in the Netherlands, such as the Wadden Sea islands and the Lauwersmeer. Later on reports from countries along the migration route of Ruffs started to come in: first Germany and southern Sweden, but subsequently also from northern Scandinavia. Already during summer the first resightings were received of birds migrating southwards, leaving the breeding areas and heading for winters quarters. Again most birds were reported from our study area in Southwest Fryslân and from the Lauwersmeer, but also from Belgium, France, and Italy. Even in winter, scarcely an observation has been mailed in, lately mostly from Belgium.



Resightings of colourringed birds are essential data in our research. This means that our research strongly hinges on bird watchers who take the effort to report their observations. Reports can be sent to the contact address listed below (preferably via e-mail). Every resighting is valuable; resightings from within our study area are of the same importance as resightings from far abroad. With these data we will be able to estimate the annual survival

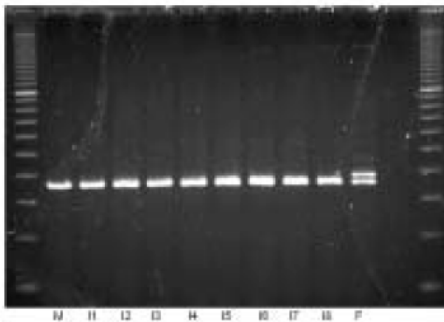


Varangerfjord, northern Norway
4 June 2004. Photo: Jukka Könönen

and we can assess the importance of the Dutch staging sites.

DNA research and the discovery of the Faeder

The collaboration with the Fryske wilsterflapper and their ringing research has already yielded a major discovery: Joop Jukema (a wilsterflapper) and Theunis Piersma revealed the existence of male Ruffs resembling the much smaller females. These cryptic males do not develop colourful ruffs and tufts in spring and they are almost as small as the females. These males, called "faeders", may have a completely different mating strategy. Resembling a females might prevent recognition by other males, creating the opportunity to steal copulations. Recently, a publication has appeared, explaining the faeders in more detail, see Jukema & Piersma 2004 in *Limosa* 77: 1-10.



Result of the molecular-genetic sex determination. Numbers 11-18 (in the middle) are faeders, having the same genetic profile as the male (M, far left). A female shows two DNA bands (F, far right).

For sure we were very eager to colourring these faeders and last year extra attention was paid to all caught reeves which seem to be largely bigger than an average female. The wing length of female Ruffs (reeves) varies between 150 en 170 mm, in males it is between 180 en 200 mm. All intermediate birds which do resemble reeves, but appear to have slightly larger wings (between 170-180 mm) and no ruffs or tufts, might be cryptic males (faeders). We were lucky. Between 23 March and 8 May 2004 we have caught 10 intermediate males, colourringed them and took a small blood samples. The blood samples have been processed in the laboratory to determine the molecular sex. All 10 birds appeared to be males, although their strong females appearance!

Measuring wing length proved to be a sufficient tool to discriminate these cryptic males from females.

But we had not run out of luck yet. This time one of the many enthusiast bird watchers reporting their resightings to us came into play. In June 2004, Jean Titou Champion (from France), had travelled to Varanger in Norway to enjoy the display of Ruffs at a lekking site he had visited before. There he found and photographed one of the faeders we had colourringed a few weeks earlier, but what he reported was very spectacular. The bird was having a copulation with one of the dominant males. We have double checked the blood samples from the freezer, but it is beyond doubt: this bird is a male. It appears to go very far in preventing to give itself away as a male! Next season we want to apply some faeders with radio transmitters next to the colour rings to learn more about this interesting phenomenon.



A faeder, ringed on 10 april 2004 at Hindeloopen (NL) and resighted on 17 juni 2004 at Varanger, northern Norway. This bird appeared to be a cryptic male! Foto: Jean Titou Champion

Grassland use and feeding ecology

In the past, south-western Fryslân must have been especially attractive for migrating Ruff: it had many extensively managed wet grasslands, where herb rich vegetation grew on the peat soils, the landscape was very open and many large roosting sites were available. Recently, especially the drainage management has changed. The area is drier now and the agricultural habits have intensified. Probably due to this, the number of female Ruff making a stopover in

Fryslân may have declined strongly. Prey species, like earthworms, bury deeper when land is drained more intensively. The males having longer bills might be less affected by more intense agriculture management than the females, what might explain the skew in sex ratio. To test this idea, we studied the meadow-use of Ruffs en Reeves that stopover in spring. In 2003 and 2004, between the end of March and beginning of May 125 meadows were monitored on a transect from Lake IJsselmeer to 25 km inland.

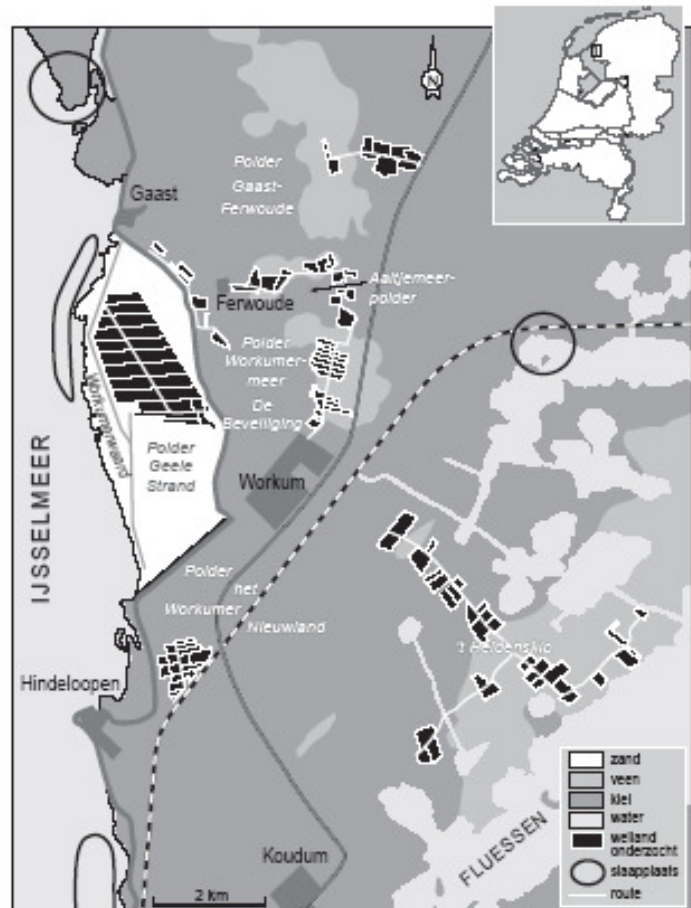
Per meadow we scored the presence of Ruffs and/or other meadow birds.

Other meadow characteristics that were scored are: grass height, drainage level, type of manure applied, grazing intensity, openness of the surrounding landscape, and distance to the nearest roost.

The most important characteristics in 2003 explaining meadow use turned out to be "sward height" and "distance to the roost". Ruff mostly foraged nearby roosts and in short vegetation.

Meadows in an open landscape were more often visited than meadows with grove/trees in the surroundings. There was a difference between the males and females. The expected preference for meadows on peat soils was not found for Ruff, but only for Reeves.

The Reeve stayed closer to the roost and chose meadows that were drained less. We also found clues that the sex-differences are connected with feeding abilities. In mixed flocks of Ruff, females got a higher pacing rate than males but achieved lower food-intake rates when foraging on soil animals like earthworms and leatherjacket-larvae. Females were more often found to prey upon (adult) insects than males.

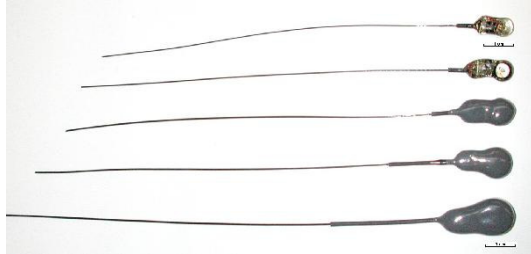


The research was continued in spring 2004. Data are still being analysed. In 2005, next to the census of the meadows, more attention will be paid to the differences in feeding behaviour between males and females. We will especially study the difference in intake rates on extensively managed grassland, just mowed (intensively managed) grassland and arable fields. We want to get more insight in the behaviour of individual birds, through radio-tracking Ruff (see below). The results from the research have to help us understand more about the choices that Ruff and Reeve can (or have to) make during their refuelling period in the Frisian meadows. For managing grasslands it is important to now what the main factors are that determine the presence of the Ruff. In the near future (after 2005), also a comparison will be made with the feeding ecology of Ruff in the countries on the more easterly situated migration routes, where the females pass through in much higher numbers.

Spring 2005 and future

In 2005 we will continue on the same course. Our team of the RUG will again, with the help of new students, colouring the Ruff that are to be caught by the 'wilster-netters'. Again we will take blood-samples for DNA analysis and in addition feather samples for isotope analysis will be collected. We will also start studying the immuno-competence of Ruffs.

Radio-telemetry will be used to answer our research questions in more detail. We want to equip



50 individual Ruff with a radio-transmitter. This 1.8 gram transmitter, with a 10 cm long antenna, will be glued on the back of the bird at the base of a few clipped feathers (this method of gluing transmitters on the back has been tested on a similar sized bird, the red knot *Calidris canutus*, in captivity and appeared not to be harmful). Such a transmitter operates for about nine weeks, which is

amply enough to follow individuals during the stop-over period from half March to the beginning of May. When the feathers moult the transmitter will fall off automatically. On fixed localities 10-12 automatic radio-tracking stations will be placed. These stations register the presence of an individual daily and map its flight movements and time schedules. Besides, hand-held receivers will be used regularly to collect additional information.

The specific questions that we want to answer are:

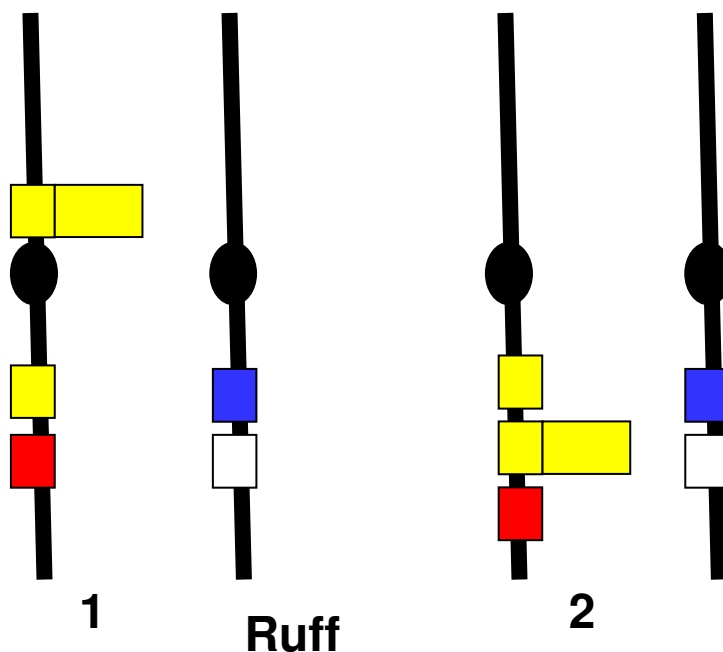
1. How many Ruff use the grasslands in south-western Fryslân and which part of the total world population does this represent? Colouring resightings will only yield an underestimate of an individual's staging time. A radio-transmitter gives a very precise measure of the point of time at which an individual departs for its breeding ground, so we can determine more accurately what the size of the population is that migrates through.
2. What is the range of an individual and is this connected with specific individual characteristics or sex? Do individuals use different roosts? When individuals use a very large area, the chance to follow the daily movements of a colour-banded individual becomes small; with radio-transmitters and automatic receivers it will however be possible.
3. We want to map the nightly use of foraging grounds and roost. Spatial distribution often differs between day and night. At this scale, radio-transmitters are the only possibility to follow the birds during their nightly activities.

In 2005 we also want to continue our research on the faeders. We hope to follow them intensively with radio-transmitters during their migration through the Netherlands.

If you have questions about this newsletter, please do not hesitate to contact us. We wish to express our thanks to everybody who helped in one way or another. We hope for a successful 2005!

Jos Hooijmeijer
Yvonne Verkuil
Petra de Goeij
Jan Wijmenga
Christiaan Both
Theunis Piersma
.....and all Ruff catchers!

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Colour ringing scheme for Ruffs

Each bird has a flag (on tibia or tarsus) and 4 colour rings (2 per tarsus)

Used colours: yellow, red, blue, white

Position of metal ring is of no importance to the code