

Short communications

Loss of wader habitat in the United Arab Emirates

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Keywords: coastal waders, habitat loss, wetlands, United Arab Emirates, Middle East

Introduction

The wetlands along the coast of the northern United Arab Emirates (UAE) have been shown to hold important numbers of waders during autumn migration (Uttley *et al.* 1988), spring migration (Keijl *et al.* 1998) and in winter (Aspinall 1995, Evans 1994, Richardson 2003, Fig. 1). However, over the last 20 years, since regular wader counts began, the rate of coastal development has increased so dramatically that it is now feared there will be an almost total loss of coastal wader habitat in the UAE resulting in a displacement of at least 21,000 birds.

Wader numbers

The coast of the Northern UAE was counted in autumn 1986 and 1987 (Uttley *et al.* 1988) and shown to hold at least 35,000 waders. In autumn 1994, a count of three key sites that held 30,500 in 1986 showed a combined total of only 6,234 (Table 1). Midwinter counts between 1991 (Aspinall 1995) and 2001 (Richardson 2003 and unpublished) showed a smaller, but nonetheless significant wintering population of at least 25,000 waders (Table 2), although completeness of

counts varied between years. A spring count in 1995 totaled 5,624 waders from just three sites (Keijl *et al.* 1998, Table 1). In all counts, waders have been spread over nine sites along the coastline, but with concentrations at Khor Dubai, Khor al Beidah and Al Jazeera Khor (Tables 1 & 2).

Habitat changes

Since the early 1990s there has been an increasing pace of coastal development within the emirates. This had led to the complete destruction of many coastal wetlands and damage or severe disturbance from leisure activities to others. The habitat loss and number of displaced waders at individual sites is as follows:

Dhayah/Rams and Ghalilah

Max autumn count 2,000, max winter count 8,765. The shallows and shoreline from Dhayah to Ghalilah were dredged and filled to create a new free trade zone for Ras al Khaimah. By 2005, work was well underway and numbers of birds had declined. It is expected that there will be almost total loss of habitat resulting from either development or disturbance.

Status: Habitat loss, up to 100%; numbers displaced, up to 200 in autumn and 8,765 in winter.

Ras al Khaimah Khor

Max autumn count 650, max winter count 2,281. There has been extensive damage and destruction to this creek. About

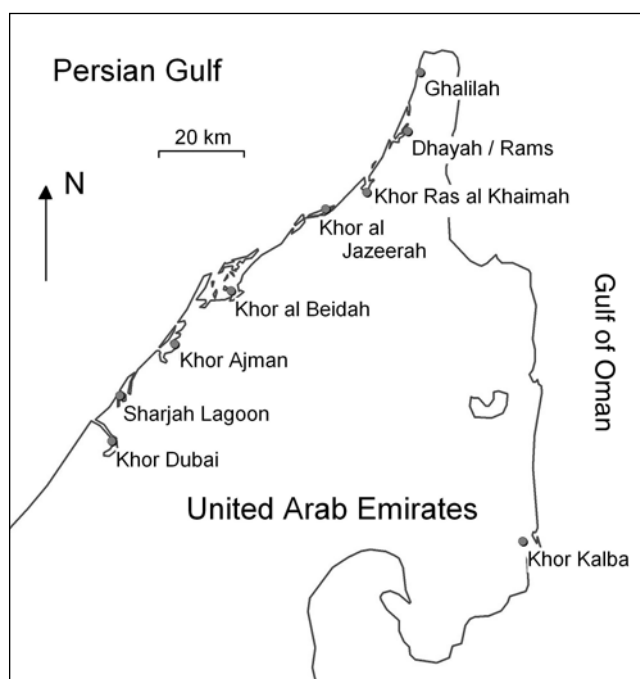


Fig. 1. Map of the United Arab Emirates and the location of the study areas.



Fig. 2. Khor Dubai, showing engineering and mangrove planting that has reduced its attraction to waders (photo: Neil Tovey)

200 ha of mangroves were removed and a substantial area of mudflat was bulldozed in 2002 to make way for a golf course, now built in the middle of the former lagoon.

Status: Habitat loss up to c.80%; numbers displaced, possibly 520 in autumn and 1,825 in winter.

Al Jazeerah Khor (also known as Al Jazeera al Hamra)

Max autumn count 3,500, max winter count 7,742. The site was protected and declared a conservation area in about 2000. Signs were erected along the shoreline announcing the outlaw of development, fishing and refuse dumping. However, a massive marina and leisure development was planned following the death of the old Ruler of Ras al Khaimah. Starting in 2005, dredging and bulldozing destroyed the southern, most important wader feeding and roosting areas. By Sept 2006, the southern end of the khor had been destroyed by dredging and infilling, as part of a residential and marina development, but the northern area remained undisturbed.

Status: Under severe threat, numbers displaced unknown.

Khor al Beidah

Max autumn count 10,000, max winter count 5,294. A vast natural sheltered tidal lagoon consisting of a dozen islands and shallow shoals. Except for deep dredging of the northern section to extract cement products in 2000, no damage or unnatural development had taken place up to the end of 2006. However, the construction of an extensive and well-marketed marina and luxury housing development is scheduled along the whole length of the shoreline south of Al Rifah comprising prime wader habitat. Potentially, this could be devastating.

Status: Under severe threat, numbers displaced unknown.

Khor Ajman

Max autumn count 582, max winter count 1,260. This site appears to remain unspoilt. However, it does not hold significant numbers of waders.

Status: Appears safe, numbers displaced unknown.

Sharjah lagoon (also known as Khor al Mamzer and Khor Khan)

Max autumn count 1,500, max winter count 410. The whole of Khor Khan was dredged and landscaped in 1991 to form a leisure waterpark, which is still known as Khor al Mamzer, but no wader habitat remains.

Table 1. Counts of migrating waders in the Northern United Arab Emirates (from Uttley *et al.* 1988 (1986 & 1987 data) and Keijl *et al.* 1998 (1994 & 1995 data) (NC = No Count).

Site	1986 Autumn	1987 Autumn	1994 Autumn	1995 Spring
Ghalilah	100	1,280	NC	NC
Dhayah/Rams	2,000	77	NC	NC
Ras al Khaimah	650	385	NC	NC
Al Jazeerah Khor	3,500	3,500	737	267
Khor al Beidah	10,000	10,000	1,305	1,153
Khor Ajman	100	582	NC	NC
Khor al Mamzer	1,500	700	NC	NC
Khor Kalba	200	142	NC	NC
Khor Dubai	17,000	10,000	4,192	4,204
Totals	35,050	26,666	6,234	5,624

Status: Habitat loss 100%, numbers displaced 1,500 in autumn and 400 in winter.

Khor Kalba

Max autumn count 650, max winter count 569. Contrary to promises by the Ruler of Sharjah to protect the site, massive earthworks were carried out over 2002–2006 to build a deep inland creek and “cornich”, including wide roads and car parks adjacent to the former pristine Kalba creeks. The waterway was linked to the tidal mangroves and this badly damaged the hydrology and tidal flow of Khor Kalba. An extensive area of well-developed mangroves was removed to make way for a leisure road through one of the creeks, killing all mangroves upstream.

Status: Habitat loss up to 80%, numbers displaced possibly 520 in autumn and 1,825 in winter.

Khor Dubai (formerly Dubai Creek, now known as Ras al Khor Wildlife Sanctuary)

Max count 17,000, max winter count 12,422. The site was recognized as important and a possible breeding site for Greater Flamingo *Phoenicopterus ruber* after breeding attempts in 1984. An artificial island was created in 1986. No breeding occurred and subsequently, in 1998, the level of the mudflats was reduced by an average of 1 metre by scouring with a bulldozer to reduce the rate of tidal flow and promote

Table 2. Midwinter wader counts in the Northern United Arab Emirates (Richardson 2003 and authors' unpublished data; NC = No Count).

Site	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Ghalilah	709	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dhayah/Rams	8,156	NC	NC	843	NC	NC	338	5,680	950	NC	NC	1,400
Ras al Khaimah	600	NC	NC	NC	2,281	NC	NC	506	NC	1,064	NC	NC
Al Jazeerah Khor	7,742	245	NC	1,593	1,514	2,002	64	4,850	2,394	1,001	1,534	927
Khor al Beidah	2,688	2,786	3,095	1,713	1,886	2,313	5,294	4,581	2,652	409	1,776	5,555
Khor Ajman	NC	NC	NC	NC	NC	NC	NC	NC	1,260	NC	249	244
Khor al Mamzer	410	56	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Khor Kalba	NC	23	NC	104	117	37	95	402	569	203	68	64
Khor Dubai	6,200	17,479	NC	12,422	11,909	4,514	7,334	6,366	6,211	3,286	3,682	4,024
Totals	26,505	20,589	3,095	16,675	17,707	8,866	13,125	22,385	14,036	5,963	7,060	11,970

the growth of mangroves which were planted over 80% of the wader feeding habitat (Fig. 2). It was thought, mistakenly, that this would encourage more birds to breed, especially flamingos. This management has decreased the site's value for waders, with roosting and feeding sites reduced. Therefore wader numbers have declined. Artificial feed is provided three times per day for flamingos at feeding stations.

Status: Habitat loss *c.* 75%, numbers displaced at least 12,750 in autumn and 10,000 in winter.

Conclusion

Based on maximum counts, we estimate that the habitat supporting at least 15,000 waders on autumn passage and 21,000 waders in winter has been lost in the UAE over the past 20 years. However, these figures almost certainly underestimate the loss because maximum counts from different sites on different dates and years must involve some degree of double counting. This means that it will only be possible to quantify the loss properly by carrying out coordinated complete counts of all sites. Studies by Uttley *et al.* (1988) and Keijl *et al.* (1998) showed that wader turnover rates in the UAE are particularly high during passage. Therefore if turnover could also be taken into account, the total number of birds affected by habitat loss would be shown to be much higher.

Where habitat loss has been incomplete, the remaining areas are often highly disturbed and degraded, making them far less suitable for waders.

With extensive development continuing in the UAE, it is likely that within the next few years we could see an almost complete loss of good wader habitat in the region. Progress in safeguarding important bird areas in the Emirates has been very patchy (Aspinall & Hellyer 2006) and, given the pace of development, especially along the coastal fringe, both in the UAE and over a large part of the Arabian peninsula, we are in danger of losing much of the habitat for breeding, wintering and migrating waders unless protection measures are introduced as a matter of urgency.

We are grateful to Tom van der Have for commenting on a previous draft.

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New breeding site for Asian Dowitcher *Limnodromus semipalmatus* in W Mongolia with one bird from NW Australia

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Keywords: Asian Dowitcher, *Limnodromus semipalmatus*, Mongolia, breeding, migration, wintering, Australia

During an ornithological expedition to western Mongolia in June 2006 we visited Airag nuur (48°53'N, 93°26'E), a 143 km² freshwater lake at 1,030 m a.s.l. It is recognised as an Important Bird Area (IBA) and as a Ramsar Site, and it is part of the Khan Khokhij–Khjargas Nuur National Park. The lake belongs to the Great Lakes Basin which has no drain (Bränlich 2002) and which is a northwesterly extension of the Gobi Desert (Barthel 1990). The main inlet of the lake is the Zavkhan gol which forms a delta of *c.* 8–10 km² on the western shore.

Together with Christoph Bock, Katja Bränlich, Markus Deutsch, Martin Grimm, Nana Heseler and Steve Klasan I spent the four days 16–19 June 2006 in the Zavkhan gol delta. We systematically counted waders that were feeding on the partly flooded mudflats, but we were particularly interested in the enigmatic Asian Dowitcher *Limnodromus semipalmatus*, a species that numbers only about 20,000 individuals worldwide (del Hoyo *et al.* 1996). There are some old records of this species at Airag nuur (e.g. Liedel 1982, A. Bränlich, pers. comm., own observations in 2001), but there has been no evidence of breeding there.

On 17 and 18 June 2006, we counted a total of 57 adult Asian Dowitchers in the central delta region. They were

scattered in three clusters or loose colonies of 16, 19 and 22 individuals, respectively. These clusters were about 2–3 km apart. On 18 June, I was observing dowitchers in one of the clusters located in a very wet part of the delta. Some birds were already breeding, while others were performing ground display or were feeding in shallow water. Without great effort, I found four nests with clutches of four, three, two and two eggs, respectively. All of them were apparently being incubated, since each nest was found by flushing a female. All were built on tufts of grass that were only a few centimetres higher than the water level. In one case, two nests were only seven metres apart.

While still observing the birds with my telescope, I spotted a male wearing a coloured leg flag. It was guarding a female that was just walking up to her nest. In the following 30 minutes the male stayed in the vicinity of the nest and did not participate in a collective display by several birds some 130 m away. As I approached the nest, it made alarm calls. When I approached more closely, both the male and female left the nest area. They walked off and apparently tried to hide themselves among the dense vegetation. The male had a bright yellow flag above the intertarsal joint on its right leg with a metal ring below the joint (Fig. 1). There were no rings



Fig. 1. Male Asian Dowitcher with yellow leg flag from NW Australia together with two females close to a nest, Airag nuur, Mongolia, June 2006.



Fig. 2. Asian Dowitcher nest with four eggs (centre foreground) at Airag nuur, Mongolia, June 2006.

on the left leg. The metal ring could not be read in the field. It was subsequently established that the bird would have been ringed sometime between 1992 and 2006 in NW Australia, either at Broome, Eighty Mile Beach or Port Hedland Saltworks. In total, 107 Asian Dowitchers have been marked with a combination of a yellow flag and a metal ring at these sites over this period (C.D.T. Minton, pers. comm.). The ringing

sites are about 10,000 km to the southeast of the re-sighting in western Mongolia. This observation constitutes the first long-distance recovery of an Asian Dowitcher to date (C.D.T. Minton, pers. comm.).

In another colony, some females showed “rodent run behaviour” that strongly indicates local breeding (M. Deutsch, pers. comm.). In the third colony we recorded displaying

birds, but did not try to locate further nests.

The breeding habitat of the Asian Dowitchers at Airag nuur was particularly wet, shallow, flooded parts of the delta. The intensity of grazing by horses and camels was less than in other areas. Hence, the vegetation was fairly dense, with a mosaic of grass tufts (on which the nests were built) and open mud (used for feeding). This is a similar habitat to that reported by Feflov & Tupitsyn (2004) for Asian Dowitchers in the Selenga Delta at Lake Baikal. However, Feflov & Tupitsyn say that dowitchers at Lake Baikal prefer areas of shallow water that are only sparsely vegetated, and avoid large areas of vegetation, especially where the vegetation is dense. This seems to be in contrast to Airag nuur where fairly densely vegetated areas were used (see Fig. 2 for example).

The richly heterogeneous sites occupied by dowitchers also attracted other waders: within about 10 ha there were 35 pairs of Pied Avocet *Recurvirostra avosetta*, 16 pairs of Black-winged Stilt *Himantopus himantopus*, 5 pairs of Little Ringed Plover *Charadrius dubius*, 3 pairs of Northern Lapwing *Vanellus vanellus*, 10 pairs of Marsh Sandpiper *Tringa stagnatilis*, 25 pairs of Common Redshank *T. totanus* and two breeding female Ruff *Philomachus pugnax*. Furthermore, there were about 20 pairs of Common Tern *Sterna hirundo* and 20 pairs of displaying White-winged Tern *Chlidonias leucopterus* (at least one of them already with a nest).

The Asian Dowitcher has a very patchy distribution between Western Siberia and Kazakhstan and the Russian Far East (del Hoyo *et al.* 1996). The region with the largest number of breeding birds stretches from the Transbaikalian region and Mongolia to NE China. For Mongolia, there are many scattered records that indicate that Asian Dowitcher is a widespread breeding bird and passage migrant (Liedel 2001). Our record of 57 birds showing nesting behaviour at Airag nuur constitutes the largest known breeding concentration in Mongolia to date (Liedel 2001). Almost certainly our record relates solely to local breeding birds, since the observations took place well outside the usual migration periods (at the Selenga delta, Lake Baikal, most birds arrive before 20 May but arrivals occur as late as 5 June (Mel'nikow 1985)). Moreover this is confirmed by the finding of several nests in one of the colonies. No other breeding sites are known around Airag nuur, but there is suitable habitat at Khar Us nuur and Uvs nuur in the Great Lakes Basin. However, those lakes are very large and particularly difficult to access. Hence there have been no systematic surveys for breeding dowitchers (A. Bräunlich pers. comm.).

Asian Dowitchers are said to lay two eggs and only occasionally three, and one clutch of four eggs was assumed to be laid by two females (Mel'nikow 1985). Therefore, the

clutch of four at Airag nuur (Fig. 2) seems unusually large. However, the closest relatives and congeners in NE Asia and in N America (Long-billed *L. scolopaceus* and Short-billed Dowitchers *L. griseus*) typically have four eggs (Jehl *et al.* 2001, Takekawa & Warnock 2000) and egg dumping is generally rare in shorebirds, so it seems possible that four-egg-clutches of Asian Dowitchers may not be so unusual as previously thought.

The winter range of Asian Dowitchers covers a vast area from the eastern shore of the Indian Subcontinent across the islands of SE Asia to N Australia. The majority of birds winter on the coast of the Greater Sunda Islands and the Philippines. The Australian wintering population is about 450 (Geering *et al.* 2007). The Airag nuur breeding site in W Mongolia lies quite far west within the known breeding range. At a longitude of 93°E it is about as far west as the Gulf of Bengal, one of the species' most westerly wintering sites. Therefore it seems surprising that the wintering ground of a W Mongolia breeding bird should be so far east of the species' wintering range. Whether this constitutes an exception or whether this is a case of leap-frog migration occurring more regularly, can only be confirmed by more ringing recoveries or leg-flag sightings.

I am grateful to Axel Bräunlich for organising the expedition and for many useful hints. Holger Schielzeth, Axel Bräunlich and Peter Collins helped by reviewing an earlier draft. I also thank Clive Minton for providing information on wader ringing in Australia.

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Reovirus associated with mortality of an Upland Sandpiper

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Keywords: Upland Sandpiper, *Bartramia longicauda*, reovirus, infectious disease, pathology, radio-telemetry

Population dynamics of waders are shaped by a range of different environmental factors including annual variation in food availability, climatic conditions, predation pressure, and the interaction of these factors with population density (Evans & Pienkowski 1984, Yalden & Pearce-Higgins 1997, Whitfield 2003). One factor that is poorly understood in most wildlife populations is the ecological role of pathogens and parasites (Friend *et al.* 2001). Disease dynamics are difficult to study in free-living birds because carcasses of small animals are usually consumed by scavengers and decompose rapidly (Osborne *et al.* 2000), and because large die-offs are rare events (Adams *et al.* 2003, Woodard *et al.* 1977). Nevertheless, diseases of waders may be of ecological and epidemiological importance, particularly if long-distance migrants are a vector for dispersal of zoonotic pathogens, such as West Nile virus (Komar 2003), avian influenza virus (Hurt *et al.* 2006, Makarova *et al.* 1999), avian cholera (Adams *et al.* 2003), and avian malaria (Mendes *et al.* 2005).

Here, we report isolation of a reovirus from the brain of a wild Upland Sandpiper *Bartramia longicauda* found dead in the field. Reoviruses are viruses of respiratory or enteric origin (REO), and are characterized by spherical virus particles 75 to 80 nm in size, a double-stranded RNA genome, and a double capsid protein shell (Read-Connole 2000, Ritchie & Carter 1995). Reoviruses are best known as a pathogen of domesticated or captive poultry, waterfowl and psittacines (Ritchie & Carter 1995, Robertson & Wilcox 1986), but have also been detected in wild populations of waders, waterfowl and other birds (Docherty *et al.* 1994, Hlinak *et al.* 2006, Hollmen *et al.* 2002).

We conducted a population study of Upland Sandpipers during April to August of 2002–2007 at Konza Prairie Biological Station in northeast Kansas, USA (39°05'N, 96°34'W). In this six-year period, we radio-marked 261 adult sandpipers by attaching transmitters with either a leg-loop harness

($n = 203$) or adhesives ($n = 58$). Mortality of sandpipers during the breeding season was infrequent, and the probability of surviving the ten-week breeding period was 0.875 in females and 0.965 in males (Mong & Sandercock 2007). We recovered eight carcasses of radio-marked birds during our six-year study, and evidence at recovery sites indicated that seven of eight dead sandpipers were killed by predators or scavenged after dying of unknown causes.

This case history is based on a single Upland Sandpiper (U.S. Fish & Wildlife Service band 1573-29956) that was captured and radio-marked on 19 May 2005 by BKS and AEC, and monitored for 30 days. We discovered the bird incubating a four-egg clutch on 25 May, and the clutch successfully hatched on 12 June. We relocated and observed the bird on three brood checks between 13–16 June. The bird exhibited normal behavior when approached by an observer, including flying, perching on fence posts, and giving vocalizations associated with brood attendance and defence of young. On 18 June, we recovered the intact dead bird lying on its side with the legs flexed and the head arched back over the spine. From inspection of the carcass at the recovery site, BKS and AEC discounted predation, collision and harness entanglement as possible causes of death. The six-day old young were not relocated and their fate was unknown.

The carcass was frozen and shipped on dry ice to the National Wildlife Health Center (U.S. Geological Survey) at Madison, Wisconsin for diagnostic examination. Upon receipt, the sandpiper was dissected by DEG and a range of cultures and tissue analyses were completed. External examination revealed no significant abnormalities. Internally, the bird was in fair body condition and in good post-mortem condition without decomposition. Internal gross examination revealed a small, atrophied spleen (1.5×5.0 mm), and reddish-black pasty material in the small intestine, presumed to be blood from intraluminal hemorrhaging. The bird had

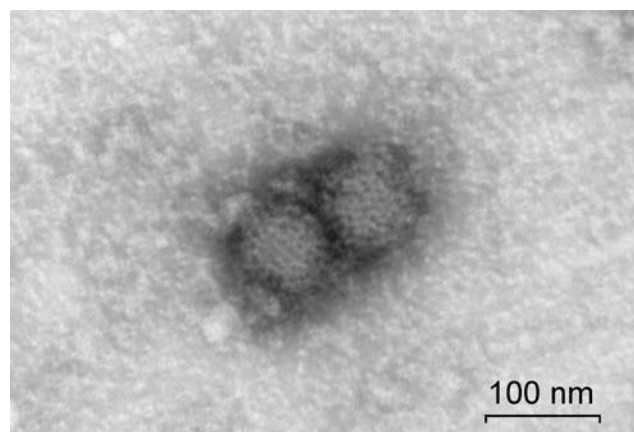


Fig. 1. Electron micrograph (negative contrast) of reovirus particles from isolates obtained from brain tissues of an Upland Sandpiper found dead under field conditions. The virions are approximately 70 nm in diameter and exhibit the typical double shelled morphology that is diagnostic of reoviruses.

been initially sexed by molecular markers based on the *CHD*-gene (Griffiths *et al.* 1998, S.M. Wisely, Kansas State University), and its sex was confirmed to be male by inspection of the gonads during necropsy.

Virus cultures of the brain prepared by HIP were positive for reovirus. Electron microscopy revealed virus particles with virions that were approximately 70 nm in diameter, and exhibited the typical double shelled morphology that is diagnostic of reoviruses (Fig. 1). No viruses were isolated from the lung, liver, kidney or small intestine. Other tissues from the dead sandpiper were negative for other pathogens and contaminants, including West Nile virus (brain, spleen, kidney), *Salmonella* (intestine), botulism type C (heart, liver), other bacteria (liver, intestine), and organophosphate or carbamate pesticides (brain).

Microscopical examinations of tissues by DEG revealed necrosis of lymphocytes in the gut-associated lymphoid tissues of Peyer's patches, Meckel's diverticulum, and caecal tonsils. Lymphocytic necrosis is a non-specific lesion with multiple causes that include reovirus infections, but may also be due to stress, intoxication, contaminants, or other types of viral infection (Green & Albers 1997). Nevertheless, we conclude that the Upland Sandpiper died with a reovirus in its brain, and the associated symptoms are consistent with reovirus infection as a cause of death.

To our knowledge, this article is the third report of isolation of a reovirus from a wild population of waders. A novel reovirus was implicated in large die-offs of American Woodcock (*Scolopax minor*) during the winters of 1989–90 and 1993–94 in the eastern United States (Docherty 1999, Docherty *et al.* 1994). Reo-like viruses have also been recovered from waders that were live-captured and sampled as passage migrants at Lake Guelpe, Germany (4 of 465 individuals, $n = 19$ species, Hlinak *et al.* 2006). Of the four positive isolates, three originated from Dunlin *Calidris alpina* and one was from a Spotted Redshank *Tringa erythropus*.

Our findings extend previous reports of reoviruses in waders in three ways. First, our case is unusual because the reovirus was isolated from the brain tissues of the dead male Upland Sandpiper. Avian reoviruses are most frequently recovered from the digestive tract (waders and other birds: Hlinak *et al.* 2006, Ritchie & Carter 1995) or respiratory organs and skeletal joints (poultry: Robertson & Wilcox 1986). Interestingly, reoviruses were also isolated from the brains of sick and dying woodcocks, and were considered the cause of death in that species (Docherty *et al.* 1994). Recovery of reoviruses from the digestive tract suggests a fecal-oral route of transmission, but infection of nervous tissues may indicate a different, as yet unknown pathway. Second, the dead Upland Sandpiper was recovered during the breeding season. Previous isolates of reoviruses from waders were collected mainly from wintering or migrating birds (Hlinak *et al.* 2006). Last, the Upland Sandpiper exhibited apparently normal behavior, and was in fair body condition at the time of death. In the case of die-offs among woodcocks, dead birds infected with reoviruses were emaciated at death (Docherty *et al.* 1994).

The ecological significance of reoviruses for Upland Sandpipers remains unclear because mortality events are infrequent and difficult to detect under field conditions. In most species of waders, relatively few carcasses of dead birds have been tested for pathogens. We encourage wildlife biologists to submit freshly dead bird carcasses for diagnostic examination whenever feasible. Obtaining viral isolates from a broader range of organs, species, and habitats will contribute to a better understanding of the role of reoviruses as a pathogen in wild populations of waders and other birds.

This article is based on Diagnostic Services Case Report 19453 of the National Wildlife Health Center. Technical assistance from Renee Long (NWHC) and Craig Radi (Wisconsin Veterinary Diagnostic Laboratory) is gratefully acknowledged. We thank Karan Odom, James W. Pearce-Higgins, and Samantha M. Wisely for logistical support and comments on the manuscript. Financial support for the field project at Kansas State University was provided by a Research Scholar award to AEC from the Howard Hughes Medical Institute Undergraduate Research Program, and by the Konza Prairie Long-term Ecological Research program funded by the National Science Foundation.

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Estimating age ratios in sandpiper flocks – an effect of capture disturbance

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Keywords: Purple Sandpiper, *Calidris maritima*, age ratio, cannon-netting, Orkney

To understand the population dynamics of bird populations, it is important to have a measure of productivity. For waders, this is notoriously difficult to obtain on the breeding grounds, but one way to determine a measure of productivity is from the percentage of first-year birds in captured flocks outside the breeding season (Clark *et al.* 2004, Robinson *et al.* 2005). However, to obtain a representative estimate, there are issues to address, such as: do the adults and young birds spend the non-breeding season together and are there any biases associated with the catching method?

There are examples of age segregation across sites within a wintering area (Summers *et al.* 2005, van der Have *et al.* 1984). Therefore, one needs to take care when combining data from different sites, and weight the data accordingly. In addition, the method of capture may give a biased figure for the age ratio. For example, mist-nets tend to catch a higher proportion of juveniles than cannon-nets (Insley & Etheridge 1997, Pienkowski & Dick 1976).

One issue that does not seem to have been investigated is the effect of human disturbance due to capture. We found that we radically affected the flock composition of Purple Sandpipers *Calidris maritima* at a catch site during a ringing visit to the Orkney Islands. The island of Papa Westray was visited between 11 and 14 December 2007. There had been no ringing of Purple Sandpipers on this island prior to our trip, so the birds were naïve. The main concentration of birds was on a 200 m long bank of rotting sea-weed along the high water mark at North Wick on the east side of the island. At high tide on 12 December, approximately 400 Purple Sandpipers fed in small groups in this area as the weeds were turned over by the wave action. The site was too difficult to net over, so the cannon-net was set on a sandy beach adjoining the weed bank. The Purple Sandpipers were extremely tame and difficult to flush off the weed bank to the beach. However, after

disturbance by a team of seven people, a large part of the flock landed on the beach. Ninety-five Purple Sandpipers were captured of which 11.6% were aged as first-year. The following day, the procedure was repeated, but it was clear that the number of birds present on the weed banks was smaller, perhaps down by two-thirds. The catch on this day was 64, and 42.2% were first-year. Only two birds were re-captured from the previous day. Thus, not only had virtually all the birds ringed on the first day dispersed to other sites, but the age ratio had changed significantly (Table 1).

We assumed that the catch made on the first day was representative of the age ratio in the Purple Sandpiper flock at this site, and that the higher percentage of first-year birds on the second day was a result of our disturbance differentially affecting the adult birds. Given that such a difference can occur at the same site using the same method, care should be taken in selecting the samples that one uses to estimate the percentage of first-year birds in wader flocks. Persistent catching at a locality may make the site less favourable and inhabited mainly by young birds.

This note was based on data collected during a joint Highland and Orkney Ringing Group venture. Paul Brown, Alison Duncan, Jacquie Heaton, Liz Humphreys, Eric Meek and Brian Ribbands also attended the catches. We are grateful to Jacquie Clark for comments on an earlier draft.

Table 1. Details of two catches of Purple Sandpipers made at North Wick on Papa Westray on 12 and 13 December 2007.

Catch	No. of adults	No. of first-year birds	% of first-year birds
1	84	11	11.6
2	37	27	42.2

Yates corrected $\chi^2 = 18.05$, $df = 1$, $P < 0.0001$

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