

Movements and biometrics of Black-faced Spoonbills *Platalea minor* at Mai Po, Hong Kong in spring 1998

David S. Melville, Paul J. Leader & Geoff J. Carey

WWF Hong Kong, GPO Box 12721, Hong Kong

ABSTRACT. Thirteen Black-faced Spoonbills *Platalea minor* were caught using a rocket net at the WWF Hong Kong Mai Po Marshes Nature Reserve in February 1998. All birds were marked using metal and plastic colour rings, and three were fitted with back-pack harness satellite transmitters. All three transmitters failed to work, but sightings of colour rings allowed information to be collected on local movements. Biometric data were obtained from all birds caught providing the largest single sample of live birds for the species.

Key words: biometrics, Black-faced Spoonbill, Hong Kong, Mai Po, movements.

INTRODUCTION

The Black-faced Spoonbill *Platalea minor* is 'critically endangered' (Collar *et al.* 1994, Baillie & Groombridge 1996). In January 1998 a total of 613 Black-faced Spoonbills were counted (Dahmer & Felley 1998), yet the known breeding population is much smaller (Chong & Pak 1999). This suggests that either a large proportion of the population is comprised of non-breeding, possibly sub-adult, birds which do not return to the breeding sites of the west coast of the Korean Peninsula, or that birds may be breeding elsewhere. In view of the critical conservation status of this species it is important to identify the breeding sites so that appropriate conservation action can be taken.

At the 'International Workshop on Conservation and Research of Black-faced Spoonbills and their habitats' organized by the Wild Bird Society of Japan in Tokyo in June 1997, it was agreed that as a high priority an attempt should be made to identify new breeding sites through satellite telemetry of birds marked on the wintering grounds. It was subsequently agreed that trapping would be attempted at the two main wintering sites: Tainan, Taiwan, and Mai Po Marshes Nature Reserve, Hong Kong.

The WWF Hong Kong Mai Po Marshes Nature Reserve lies in the northwestern New Territories, Hong Kong, at 22°29'N, 114°02'E. It is at the heart of the Mai Po and Inner Deep Bay Ramsar Site which covers an area of about 1,500 ha of intertidal mudflats, mangroves, traditionally operated shrimp ponds (known locally as *gei wai*), reed beds and fish ponds. Black-faced Spoonbills have been recorded at Mai Po since 1956 (Herklots 1967). Kennerley (1990) reviewed the global status of the species and highlighted the importance of Mai Po. Leader (1998) reviewed all Hong Kong records of Black-faced Spoonbills revealing that wintering numbers had increased considerably in recent years (from about 30 birds in the late 1980s to over 120 in the late 1990s). He further noted that mid-winter numbers were lower than those in early winter and suggested that this resulted from the movement of passage

birds through Mai Po, possibly on the way to other wintering sites in Hainan and the Red River delta, northern Vietnam.

At Mai Po Black-faced Spoonbills spend most of the day roosting. Birds feed mostly at night, but limited feeding occurs in early morning and late afternoon (Leader 1998). Spoonbills are often to be found feeding in gei wai when they are drained and prey species (fish and crustaceans) become concentrated in the channels. They have also been recorded feeding in recently drained fish ponds outside the Mai Po Nature Reserve (Leader 1998).

METHODS

An assessment of capture opportunities was made in March 1997 with the assistance of Dr. Kees Swennen and M.J. Ueta. Due to access and security issues it was decided that any catching attempt should be made within the Mai Po Nature Reserve. Catching at the roost site was not favored in view of the potentially severe disturbance impacts, in particular due to the fact that the birds are concentrated at only one site. It was considered that catching feeding birds would cause less disturbance.

At Mai Po it is possible to control water levels within the gei wai, thus allowing opportunities to determine where birds were likely to concentrate for feeding. After reviewing a number of options, it was decided that the use of rocket or cannon nets to catch feeding birds would be the most suitable.

The capture attempt was made in late February 1998. Two rocket nets (Wildlife Materials Inc., Carbondale, Illinois, USA) were used, although only one was fired on each attempt. The first catch was made on 26 February, when five birds were caught. The second catch was on 27 February when a further eight birds were caught.

Both captures were made in the late afternoon in a drained down gei wai when the birds were feeding in a channel. The birds were removed from the net and washed with freshwater since they became quite muddy when caught. They were dried by hand using towels and then placed in a keeping cage with sufficient room for them to stand.

Despite the predisposition of long-legged birds to capture myopathy (Windingstad *et al.* 1983, Minton 1993), the spoonbills showed no evidence of this condition during capture and subsequent handling.

All birds were ringed using individually numbered metal rings (British Trust for Ornithology) below the intertarsal joint. An individually numbered plastic ring was placed on the right leg above the intertarsal joint, and a unique combination of two colored rings placed on the left leg above the intertarsal joint. The numbered plastic ring and the colored rings allowed individual identification in the field. All birds were measured at the time of ringing and moult recorded.

Three birds were fitted with satellite PTTs (model T-2050, manufactured by Toyocom, Tokyo, Japan) using a back-pack harness developed by M.J. Ueta and tested on a captive bird at Tama Zoo, Tokyo. The harness was designed so that the transmitter would be shed within a few months.

The birds were released at Mai Po in a pond area with open dry mud and shallow water,

Table 1. Biometrics of Black-faced Spoonbills caught in Hong Kong in February 1998.

Ring no.	age	tail	wing length	bill width	bill length to feathering	total head	tarsus diam	tibia diam	IT joint diam	tarsus length	weight
A01	3Y	114	371	53	192	231	13	12	22.5	152	1890
A02	3Y	101	358	51	174	213	12.8	12.1	21.4	136	1540
A03	3Y	115	352	50	170	203	13.1	11.8	21.2	139	1640
A04	2Y	104	367	55	201	241	12.3	12.6	22.9	150	1900
A05	3Y	108	361	50	198	230	12.8	13	21.5	140	1640
A06	5Y	103	346	50	166	203	12.4	11.1	21.1	130	1680
A07	5Y	111	358	49	172	202	11.7	11.9	21.2	129	1650
A08	3-4Y	109	358	51	177	212	11.5	12.3	20.7	130	1470
A09	3-4Y	103	370	51	163	208	12.9	12	20.9	138	1580
A10	3Y	116	368	53	207	239	12.6	13.4	21.2	151	1700
A11	3Y	110	363	51	173	206	12.2	12.3	20.3	136	1620
A12	3Y	115	371	54	203	236	13.2	13	22.9	150	1730
A13	3Y	106	362	52	187	217	12.3	12.5	20.5	130	1540

within about three hours of capture, after dark. All birds walked away when released. Observations were made at dawn the next morning and all birds were found and all were walking. For the next week observations were made daily to check for any problems. All birds were reluctant to fly for the first few days but thereafter they began to fly. One bird (A06) caught on 27 February was found unable to fly on 2 March when it walked steadily across one drained pond, swam across a channel and then walked off into the mangroves (*Kandelia candel* and *Acanthus ilicifolius*). In view of the potential risk that the backpack harness might become entangled in the vegetation the bird was caught and released in another open site. It subsequently was seen flying strongly on 5 March.

Birds did not appear to suffer any discomfort from the harness and transmitters, and were not seen pecking at them.

RESULTS

Biometrics and moult

Measurements of the thirteen Black-faced Spoonbills caught are given in Table 1, these apparently being the first published data for live birds of this species (Hancock *et al.* 1992). Males of both the Eurasian Spoonbill *P. leucorodia* and Royal Spoonbill *P. regia* are larger than females, but the data for Black-faced Spoonbill (Hancock *et al.* 1992) are too limited to permit any such analysis. It is not possible to determine the sex of the birds caught at Mai Po.

Age determination of Black-faced Spoonbills has been little studied. Juvenile birds have black on the tips of the outer primaries and on the rachis. These dark tips persist for several years (see below), but it remains uncertain when birds attain completely white 'adult' primaries - or indeed, whether all birds attain fully white primaries. In the closely related Royal Spoonbill, Marchant and Higgins (1990) report 'remiges tipped black in some [adult] birds'. It is hoped that studies of plumage development of known-age birds at Tama Zoo, Tokyo will elucidate this problem in due course.

Table 2. Molt of primaries of Black-faced Spoonbills at Mai Po, Hong Kong, February 1998

Ring No.	Age	Primary moult	
		inner	outer
A01	3Y	5532000000	
A02	3Y	5520000000	
A03	3Y	5532000000	
A04	2Y	0000000000	
A05	3Y	1000000000	
A06	4Y	5555555555	
A07	5Y	5555555555	
A08	3-4Y	5555400000	
A09	3-4Y	5555400000	
A10	3Y	5553000000	
A11	3Y	5553100000	
A12	3Y	5541000000	
A13	3Y	5200000000	

*Age determinations are tentative and relate to calendar years, i.e. a 2Y bird was hatched in 1997

**Moult scores follow Ginn and Melville (1983) where an old feather scores '0', a fully grown new feather '5', '1' is a missing feather or one fully in pin, and '2', '3', and '4' are intermediate stages of feather growth. The innermost primary is on the left, and outermost on the right of the column.

Only one of the Black-faced Spoonbills caught at Mai Po had all white 'adult' primaries, and another had only a slight trace of black which would not have been visible in the field. All other birds had black feather tips and black on the rachis of the outer primaries, although the amount varied somewhat. Two birds with relatively little black were provisionally aged as being in their fourth calendar year (hatched 1994), eight birds were considered to be in their third calendar year (hatched 1995) and one in its second calendar year (hatched in 1997). These age determinations are, however, very tentative.

The fact that ten of the birds were in active primary moult (Table 2) was unexpected. Nothing appears to have been published on primary moult in this species, and even in other spoonbill species information is lacking. Stresemann & Stresemann (1966) suggested that moult in Eurasian and Royal Spoonbills was 'simple descendent'.

In European populations of the Eurasian Spoonbill there is a complete post-breeding moult. Primary moult starts in August-September but probably is interrupted during migration and then completed in the winter quarters by March (Cramp & Simmons 1977). The post-juvenile moult is complete starting in December/January and finishing in May (Bauer & Glutz von Blotzheim 1966, Cramp & Simmons 1977).

Movements

The three transmitters failed to work. One signal was received from one bird the day after it was released, but no further signals were received despite the fact that the bird remained at Mai Po for the following 3 months and it was still carrying the transmitter. The reason for the transmitter failure is unknown (M.J. Ueta pers. comm.).

Table 3. Sightings of ringed Black-faced Spoonbills at Mai Po, Hong Kong, spring 1998

Date	A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12	A13	Total no.
1.Mar			x	x		x	x	x	x		x	x		
2.Mar	x	x	x	x	x	x	x	x	x		x	x		
3.Mar	x				x	x		x	x	x	x			
4.Mar	x	x	x	x	x	x		x	x				x	99
5.Mar	x		x					x			x	x		
6.Mar	x	x	x		x	x		x	x		x	x		92
8.Mar	x	x	x		x	x		x	x					97
9.Mar	x	x	x						x			x	x	
11.Mar											x		x	
13.Mar													x	
14.Mar			x			x			x		x			19
17.Mar	x	x	x		x	x	x					x		71
18.Mar	x	x	x		x	x		x	x		x	x	x	84
20.Mar		x				x			x		x	x	x	
21.Mar	x	x	x		x	x		x	x		x			72
22.Mar	x	x	x		x	x		x	x		x	x	x	
23.Mar		x			x		x							61
24.Mar	x				x	x		x	x		x	x	x	
26.Mar									x					
27.Mar	x				x	x			x		x	x		70
28.Mar		x							x		x	x		32
30.Mar	x		x								x	x	x	66
2.Apr	x	x	x			x					x	x	x	51
3.Apr		x			x			x			x		x	45
4.Apr	x	x	x		x	x		x	x			x	x	55
5.Apr	x	x	x			x					x	x		55
6.Apr					x	x		x	x		x		x	
9.Apr		x												
10.Apr	x					x								
11.Apr						x		x						8
12.Apr		x	x		x	x					x	x		
14.Apr	x					x							x	14
18.Apr					x									23
19.Apr	x	x			x			x			x	x		38
25.Apr	x													2
26.Apr	x	x										x		21
29.Apr												x		1
3.May	x											x		10
4.May	x											x		11
24.May	x													1

Records of sightings of color marked birds are given in Table 2. The only records of birds away from Mai Po are as follows:

12 March. A13 was seen with a flock of 19 spoonbills in a drained fish pond at Fung Lok Wai about one km south of Mai Po (S. Buckton pers. comm.).

19 March. A06, A09 and A11 were seen with 19 other spoonbills feeding in a drained fish pond about one km northeast of Mai Po. A06 was seen at Mai Po both earlier and later on the same day.

The variability of counts of Black-faced Spoonbills in spring (Table 3, Leader 1998) suggest

that there is some movement to/from Mai Po, and Leader (1998) postulated that several pulses of migrant spoonbills might pass through Mai Po in spring. If this is so, the fact that all but one of the birds caught in spring 1998 were in active primary moult is of interest since it is unusual for birds to migrate whilst moulting (Berthold 1993). This might be taken as evidence that the birds caught were 'resident' wintering birds.

Most of the ringed birds had left Mai Po by mid-April - this being typical for Black-faced Spoonbills at Mai Po (Leader 1998). The first two birds to apparently leave Mai Po were A04 and A10, which were last recorded on 3 and 2 March respectively, when both were observed away from the release site. The fact that these birds apparently left Mai Po two-three weeks ahead of any other birds is noteworthy. A04, which was considered to be a bird in its second calendar year, was not in active primary moult when caught (Table 2), and was one of the heaviest birds caught (Table 1), which may indicate that it was carrying fat stores. Chong *et al.* (1996) recorded '1 sub-adult and 3 juveniles' (method of age determination not detailed) during the breeding season at Tok-do Island, North Korea, thus it appears that some immature birds return to the breeding grounds, although it is unknown how frequently this occurs. If it is assumed that at least one factor resulting in the delayed departure of Black-faced Spoonbills from Mai Po is related to moult, the early departure of A04 might be anticipated since the bird was not moulting. It should be noted, however, that A10 (a bird thought to be in its third calendar year) was in active moult when caught, yet disappeared one day before A04. At present it is not possible to determine what happened to these two birds.

The presence of A01 at Mai Po in late May suggests that it is unlikely that this bird migrated to the breeding grounds - a completed clutch has been found on 23 May in Korea (Chong *et al.* 1996). The presence of this bird in late May, three weeks after all other marked birds had left, might be considered to be a matter of some concern. When caught on 27 February this bird was aged as a subadult (possibly in its third calendar year) and was in active moult having replaced two primaries (Table 2). The delayed departure might be due to bird staying until it had completed moult, but it should be noted that all other 'subadult'; birds caught were in active moult, some being at a less advanced stage of moult when caught, yet all departed Mai Po ahead of A01. In the preceding three months its behavior had been normal and it had been flying strongly. Whether its delayed departure was associated with capture and/or the fitting of the transmitter must remain a matter of conjecture. A01 reappeared at Mai Po on 26 September 1998. During subsequent observations in October it was determined that the bird was no longer carrying a transmitter.

Up to five Black-faced Spoonbills, none of them color-ringed, were recorded at Mai Po throughout the late summer of 1998, being present from 22 July onwards. Numbers began to increase in mid-October, and by the end of October 1998 one other color-ringed bird had been recorded back at Mai Po - A03 was first sighted on 21 October (Yu Yat-tung, pers. comm.).

DISCUSSION

The capture of Black-faced Spoonbills at Mai Po was completed successfully. The birds

generally appeared to recover from capture within a few days. The reason for the delayed departure of one of the birds carrying a transmitter is unknown and could be cause for concern, however this bird reappeared in September 1998. The biometric and moult information obtained from the birds is of value in view of the paucity of such data and the color rings will aid in field studies in future and have already resulted in resightings at Mai Po in autumn 1998.

The failure of the transmitters was a disappointment which meant that the main purpose of the project could not be realised. However it is considered that a further attempt using satellite-tracking should be made in future in view of the urgent need for information on general biology to permit the preparation of a species management/recovery plan for the Black-faced Spoonbill.

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LITERATURE CITED

- Baillie, J. & Groombridge, B. (eds.). 1996. 1996 IUCN red list of threatened animals. IUCN, Gland.
- Bauer, K.M. & Glutz von Blotzheim, U.N. 1966. Handbuch der vogel Mitteleuropas. Vol. 1. Akademische Verlagsgesellschaft, Frankfurt am Main.
- Berthold, P. 1993. Bird migration: a general survey. Oxford University Press, Oxford.
- Chong, J. & Pak, U. 1999. The breeding sites and distribution of Black-faced Spoonbills *Platalea minor* in the Democratic People's Republic of Korea (DPRK). In: Ueta, M. Kurosawa, R. & Allen, D. (eds.). Conservation and Research of Black-faced Spoonbills and their habitats. pp. 5-9. Wild Bird Society of Japan, Tokyo, Japan.
- Chong, J.R., Pak, U.I., Rim, C.Y. & Kim, T.S. 1996. Breeding biology of Black-faced Spoonbill *Platalea minor*. Strix 14: 1-10.

- Collar, N.J., Crosby, M.J. & Stattersfield, A.J. 1994. Birds to watch 2. The world list of threatened birds. BirdLife International, Cambridge.
- Cramp, S. & Simmons, K.E.L. (eds.). 1977. Handbook of the birds of the western Palearctic. Vol. 1. Oxford University Press, Oxford.
- Dahmer, T. & Felley, M. 1998. Black-faced Spoonbill (*Platalea minor*) census, January 1998. Ecosystems Ltd., Hong Kong.
- Ginn, H.B. & Melville, D.S. 1983. Molt in Birds. British Trust for Ornithology, Tring.
- Hancock, J.A., Kushlan, J.A. & Kahl, M.P. 1992. Storks, Ibises and Spoonbills of the World. Academic Press, London.
- Herklots, G.A.C. 1967. Hong Kong birds. (2nd. ed.). South China Morning Post, Hong Kong.
- Kennerley, P.R. 1990. A review of the status and distribution of the Black-faced Spoonbill. Hong Kong Bird Report 1989: 83-100.
- Leader, P.J. 1998. Preliminary observations on the wintering ecology of the Black-faced Spoonbill in Hong Kong. Hong Kong Bird Report 1996: 143-157.
- Marchant, S. & Higgins, P.J. 1990. Handbook of Australian, New Zealand and Antarctic birds. Vol. 1. Oxford University Press, Oxford.
- Minton, C. 1993. Stress myopathy in captured waders. Wader Study Group Bulletin 70: 49-50.
- Stresemann, E. & Stresemann, V. 1996. Die mauser der vogel. J. Orn. 107 Sonderheft.
- Windingstad, R.M., Hurley, S.S. & Sileo, L. 1983. Capture myopathy in a free-flying greater sandhill crane (*Grus canadensis tabida*) from Wisconsin. Journal of Wildlife Diseases 19: 289-290.