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**Age Structure Assessment of  
Wintering Black-faced Spoonbill in  
Hong Kong 2001-2002**



Agriculture, Fisheries and Conservation Department

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# AGE STRUCTURE ASSESSMENT OF WINTERING BLACK-FACED SPOONBILL IN HONG KONG 2001-2002

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## TABLE OF CONTENT

<b>1</b>	<b>BACKGROUND</b> .....	<b>1</b>
	OBJECTIVES .....	1
<b>2</b>	<b>METHODOLOGY</b> .....	<b>2</b>
	AGE DETERMINATION .....	2
	STUDY AREA AND PERIOD .....	2
<b>3</b>	<b>RESULTS</b> .....	<b>4</b>
<b>4</b>	<b>DISCUSSION</b> .....	<b>5</b>
	POPULATION DYNAMICS .....	6
<b>5</b>	<b>RECOMMENDATIONS FOR FUTURE STUDIES</b> .....	<b>6</b>
	CONTINUED MONITORING OF AGE DISTRIBUTION OF BLACK-FACED SPOONBILLS WINTERING IN HONG KONG .....	7
	COMPARISON WITH OTHER WINTERING BLACK-FACED SPOONBILL POPULATIONS.....	7
<b>6</b>	<b>SUMMARY</b> .....	<b>7</b>

### List of Figures and Tables

Table 1.	Date and place of age determination photography of Black-faced Spoonbills, 2001-02.....	3
Table 2.	Numbers and ages of Black-faced Spoonbills photographed, 2001-02. ....	4
Table 3.	t-test of the significance of the difference in the proportion of adult Black-faced Spoonbills in loafing flocks in Hong Kong between winters of 2000-01 and 2001-02. ....	6
Figure 1.	The locations of photography points .....	3
Figure 2.	Mean percentage ( $\pm$ SD) by month of adult Black-faced Spoonbills in Mai Po, winter 2000–01 and 2001–02. ....	5

## **1 Background**

- 1.1 Agriculture, Fisheries and Conservation Department commissioned Hong Kong Bird Watching Society to conduct a study: Age Structure Assessment of Wintering Black-faced Spoonbill at Mai Po Inner Deep Bay Ramsar site, Hong Kong in 2001/02 winter. Similar studies had been carried out since 1998 (Anon 1999, 2001a, 2001b).

### *Objectives*

- 1.2 In order to find out the breeding success and to predict the population trends of Black-faced Spoonbill *Platalea minor*, continuous effort in long-term monitoring of the age structure of the wintering population in Deep Bay, Hong Kong is crucial and critical.
- 1.3 Being as part of the long-term monitoring programme, the present study aims at investigating the age structure, i.e. the ratio between adult and non-adult, of the Black-faced Spoonbills in winter 2001–02 and comparing the surveyed result with the previous studies.

## **2 Methodology**

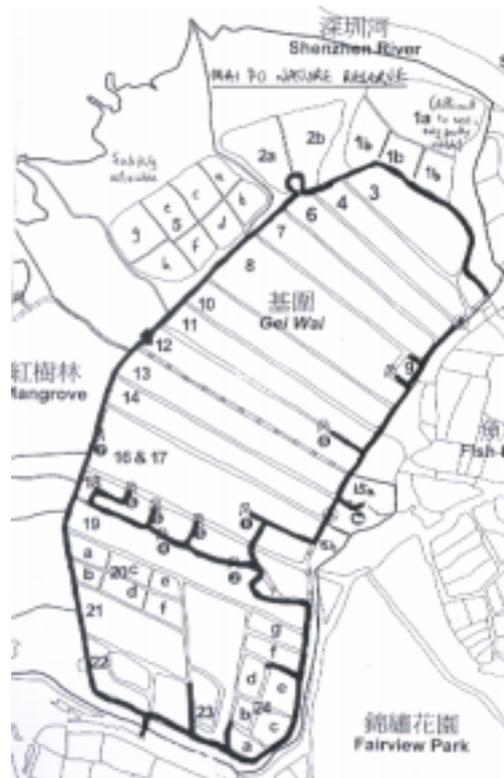
### *Age determination*

- 2.1 The most obvious distinction between adult and non-adult Black-faced Spoonbills in distance view is the colour of their wing-tips. The wing-tips of non-adult is in black color and will be replaced by white colour plumage in adult. However it is very difficult to see their wing-tips clearly unless they are extending their wings or flying. Therefore, the best and suitable way to differentiate the adult and non-adult of Black-faced Spoonbills is checking the colour of their wing-tips when they are flying. By taking photographs or video\* of loafing Black-faced Spoonbills, the number of adult and non-adult can be recorded for calculating the percentage between adult and non-adult wintering population. (\* digital photographs are captured from the video for records.)

### *Study area and period*

- 2.2 All the field surveys (taking photograph and video) were carried out within the Mai Po Nature Reserve (including the boardwalk hide for Deep Bay Area). The exact locations of the field surveys were shown in Figure 1.

FIGURE 1. THE LOCATIONS OF FIELD SURVEY POINTS.



- 2.3 The field surveys are carried out from 3 November 2001 to 28 April 2002, at interval of  $10 \pm 2$  days, totally in 20 surveys.
- 2.4 A total of at least 30 spoonbills were recorded during each group of three consecutive surveys (Table 1).

TABLE 1. DATE AND PLACE OF AGE DETERMINATION SURVEYS OF BLACK-FACED SPOONBILLS, 2001-02 WINTER.

No.	Date	Location
1	3 November 2001	Boardwalk
2	11 November 2001	Pond 6
3	22 November 2001	Pond 6
4	1 December 2001	Pond 6
5	11 December 2001	Pond 23
6	20 December 2001	Pond 6
7	29 December 2001	Pond 20
8	6 January 2002	Pond 6
9	17 January 2002	Pond 6
10	26 January 2002	Pond 24
11	3 February 2002	Pond 6
12	14 February 2002	Pond 6
13	23 February 2002	Pond 6
14	3 March 2002	Pond 6
15	14 March 2002	Pond 17
16	24 March 2002	Pond 16 & 17
17	31 March 2002	Pond 20
18*	11 April 2002	Pond 17
19	20 April 2002	Pond 6
20	28 April 2002	Pond 20

\* no photograph/video were taken

### 3 Results

- 3.1 The recorded number of each individual surveys are grouped together from the same month and the result is summarized in table 2. The total number of Black-faced Spoonbill photographed in each group in ranged from 32 number in April to 241 number in December. The average number of photographed Black-faced Spoonbills in each survey was  $46 \pm 27.5$ .
- 3.2 The percentage of non-adult raised from 25% in November to the highest of 38% in February and become 100% when only non-adults were recorded in late April. The overall average percentage of non-adult for the whole sampling period was 42%. This value is exaggerated by the last three surveys, where 100% non-adult recorded.
- 3.3 Excluding the data of April 2002, the average percentage of adult and non-adult are 69% and 31% respectively.

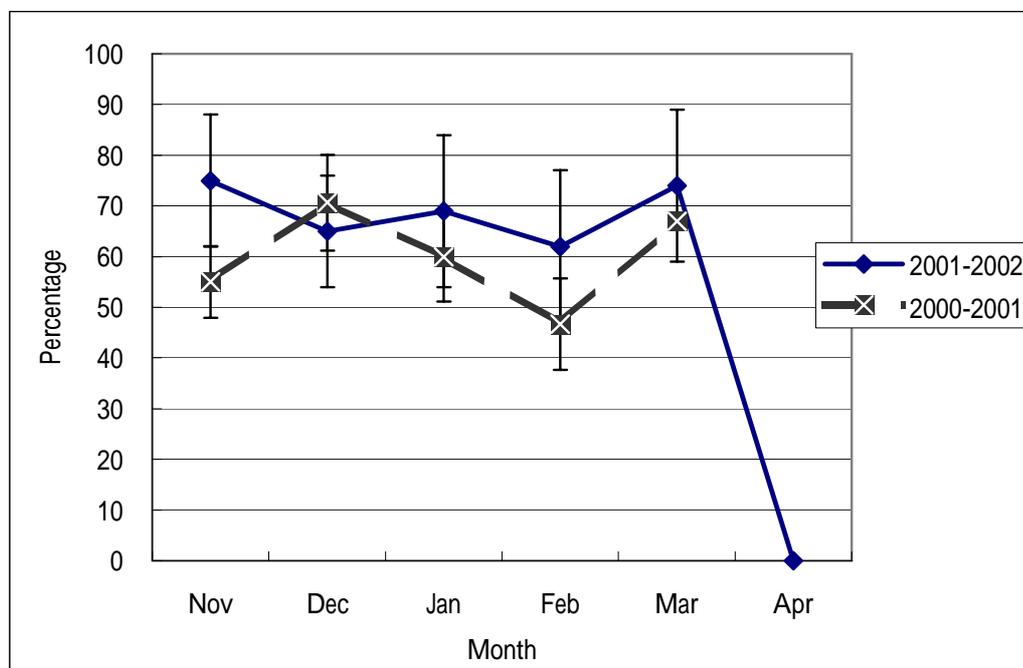
TABLE 2. NUMBERS AND AGES OF BLACK-FACED SPOONBILLS RECORDED, 2001 – 02 WINTER.

<b>Date</b>	<b>Adult</b>	<b>Non-adult</b>	<b>Total</b>	<b>% of Adult</b>	<b>% of Non-adult</b>
03-Nov-01	20	13	33	61%	39%
11-Nov-01	42	13	55	76%	24%
22-Nov-01	33	5	38	87%	13%
			126	$75\% \pm 13\%$	$25\% \pm 13\%$
01-Dec-01	19	10	29	66%	34%
11-Dec-01	50	13	63	79%	21%
20-Dec-01	55	35	90	61%	39%
29-Dec-01	32	27	59	54%	46%
			241	$65\% \pm 11\%$	$35\% \pm 11\%$
06-Jan-02	26	5	31	84%	16%
17-Jan-02	63	27	90	70%	30%
26-Jan-02	18	16	34	53%	47%
			155	$69\% \pm 15\%$	$31\% \pm 15\%$
03-Feb-02	50	18	68	74%	26%
14-Feb-02	20	24	44	45%	55%
23-Feb-02	26	12	38	68%	32%
			150	$62\% \pm 15\%$	$38\% \pm 15\%$
03-Mar-02	40	23	63	63%	37%
14-Mar-02	61	44	105	58%	42%
24-Mar-02	24	2	26	92%	8%
31-Mar-02	14	4	18	78%	22%
			208	$73\% \pm 15\%$	$27\% \pm 15\%$
11-Apr-02	0	3	3	0%	100%
20-Apr-02	0	7	7	0%	100%
28-Apr-02	0	21	21	0%	100%
			32	0%	100%
<b>Totals</b>	<b>593</b>	<b>322</b>	<b>915</b>	<b><math>58\% \pm 28\%</math></b>	<b><math>42\% \pm 28\%</math></b>

## 4 Discussion

- 4.1 The total number of recorded individual was 915, with an almost 4 times higher than the previous year (only 231 number). Increase in the sampling size should result in more accuracy and representative data on the population composition for the whole wintering Black-faced Spoonbills in Deep Bay Area.
- 4.2 In order to compare with the results of previous year (2000–01), the average percentage of adult Black-faced Spoonbills was calculated by month interval. The change of adult percentage from Nov 01 to Apr 02 is shown in Figure 2.

FIGURE 2. MEAN PERCENTAGE ( $\pm$ SD) BY MONTH OF ADULT BLACK-FACED SPOONBILLS IN MAI PO, WINTER 2000 – 01 AND 2001 – 02.



- 4.3 Statistical analysis is based on the previous data available from the report (Anon. 2001b). Though the peak number of Black-faced Spoonbills recorded in winter 2000-01 was 252 individuals while the peak number in winter 2001-02 was 192 (Y. T. Yu pers. comm.), the proportions of adult and non-adult birds present in the whole population had no significant difference (Table 3).

TABLE 3. T-TEST OF THE SIGNIFICANCE OF THE DIFFERENCE IN THE PROPORTION OF ADULT BLACK-FACED SPOONBILLS IN LOAFING FLOCKS IN HONG KONG BETWEEN WINTERS OF 2000-01 AND 2001-02.

Month	t	d.f.	95% sig. level	Significant?
Nov. 2001	0.0777	4	2.3591	No
Dec. 2001	0.2483	6	1.2785	No
Jan. 2002	0.2164	5	1.4145	No
Feb. 2002	0.1007	5	2.0096	No

#### *Population dynamics*

- 4.4 The studies in winters of 1999-2000, 2000-01 and 2001-02 show that the percentage of adults was similar at about 60% of the wintering population in Deep Bay. The international census during winter of 1999-2000 and January 2001 produced 660 and 800 individuals respectively (Dahmer and Felley 2000, 2001). Assuming that the proportion of adults in the population as a whole is the same as that in Hong Kong, this equates to an adult population of about 480 individuals and hence (assuming an equal sex ratio) of 240 breeding pairs. Chong *et al.* (1996) recorded a mean of 1.2 young fledged by each breeding pairs. Hence, the expected recruitment during the breeding season of 2001 is 288 juveniles. In the absence of any post-fledging mortality this would have resulted in a world population of 1088 individuals in autumn 2001. This calculation does not take into account of mortality and it is based on an estimate of productivity obtained from a very small sample of only five pairs. Despite these uncertainties, the international census during winter of 2001-02 resulted in 969 individuals (Dahmer and Felley 2002), a difference of only 10% from estimate derived from the age ratio of the Hong Kong population in 2000-01.
- 4.5 From the results of three consecutive age structure assessment of wintering Black-faced Spoonbills from 1999-2002, the proportion of adults and non-adults remains stable over the past three years. Moreover, the successful breeding population contributed the world population of this endangered species from 660 individuals in 1999 to 969 individuals in 2001. According to the assumption we made in the population dynamic, it is possible to predict the world population of Black-faced Spoonbill in the winter of 2002-03 would be 1185.

## **5 Recommendations for future studies**

### *Long-term monitoring of age distribution of Black-faced Spoonbills wintering in Hong Kong*

- 5.1 As this photographic method has been employed for three consecutive years since 1999, it is highly recommended that studies adopting similar methodology should be continued in future winters in order to monitor the success of the breeding population. More accurate and representative results may be obtained if the number and scale of surveys can be increased and the surveyed area can be extended to Deep Bay.

### *Comparison with other wintering Black-faced Spoonbill populations*

- 5.2 It would be useful to obtain comparable data from other local and oversea important wintering surveys such as Taiwan in order to assess whether different age classes of Black-faced Spoonbills differ in their wintering locations. Similar methodology is recommended to be employed to undertake surveys at other wintering population.

## **6 Summary**

- 6.1 A photographic survey of Black-faced Spoonbills present in Hong Kong during the winter of 2001-02 was undertaken in order to determine the percentage of adult and non-adult in the population. A total of 915 individuals (repeat sampling of individuals) were recorded (by photograph or video) in the 20 surveys carried out from November 2001 to April 2002. It was estimated that 60% of the birds present were adults. The proportion of adults did not differ significantly from the previous study 2000-01 using similar survey technique despite the peak number show a decline from 252 to 192 individuals.
- 6.2 From the preliminary estimation of population trend of this endangered Black-faced Spoonbill based on the three consecutive studies, the whole population showed a healthy positive growth from 660 during winter of 1999-2000 to 969 in 2001-02. It is expected to have 1185 individuals during winter of 2002-03.

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