

AGE AT FIRST BREEDING AND CHANGE IN PLUMAGE OF KELP GULLS *LARUS DOMINICANUS* IN SOUTH AFRICA

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In South Africa, kelp gulls *Larus dominicanus* first breed when 4 years old. At least 50% of 4-year-olds breed; virtually all older birds breed annually. Most chicks leave natal colonies in the austral autumn and winter, when about 6 months old, and 60% of them may not return until aged 2 or 3 years. One 3-year-old showed signs of defending territory, but birds only attain full adult plumage when aged 4. The plumage of 3-year-olds is similar to that of adults, but the white spots on the outer primaries are less well developed and the secondaries and inner primaries have no white trailing edge. Chicks are dark, whereas birds aged 1 and 2 years gain increasing amounts of pale or white plumage on the face, neck, underparts and tail.

Kelp gulls *Larus dominicanus* nest in Antarctica, at subantarctic islands, in South America, New Zealand, Australia and in southern Africa (Burger and Gochfield 1996). All populations, except that in southern Africa, are of the nominate race *L. d. dominicanus*. That in southern Africa comprises an endemic subspecies, *L. d. vetula*, distinguished by its brown to dark-brown iris and generally larger size (Brooke and Cooper 1979). The size of the southern African population was about 11 000 breeding pairs between 1976 and 1981 (Crawford *et al.* 1982), but some colonies may have since increased (Crawford *et al.* 1994, 1997).

The age at first breeding of kelp gulls is not known (Higgins and Davies 1996), but it was previously considered to be 3 years or older (Fordham 1964). In estimating the overall population of kelp gulls in southern Africa, it was assumed to be 4 years (Crawford *et al.* 1991). This paper documents the age at first breeding for *L. d. vetula*, based on observations of birds of known age. It also describes the plumage of southern African kelp gulls as it changes with age.

MATERIAL AND METHODS

Kelp gull chicks were banded at Bird Island, Lambert's Bay (32°05'S, 18°18'E), and at Malgas Island (33°03'S, 17°55'E), annually between 1992 and 1998 (Table I). Chicks were banded so that both colony of origin and cohort (season when hatched) could be clearly distinguished. From 1992/93 to 1996/97, both 11-mm stainless-steel rings and 11-mm

(internal diameter) coiled, coloured plastic rings 10 mm deep were used. In 1997/98, the stainless-steel rings were coloured (powder coated) and only this ring was applied. In South Africa, the species breeds annually and chicks are present at breeding grounds from late October until early February (Crawford *et al.* 1997).

Malgas Island and Lambert's Bay were both visited every month between December 1992, when the first chicks were banded, and March 1999. On each visit, the number of birds of each colour code seen was recorded. Especially careful searches were made during October and November, when many pairs are incubating (Crawford *et al.* 1997) and hence may be readily associated with nests.

At Lambert's Bay, on 5 November 1998, photographs were taken of birds representing each of four known age-classes, and of birds assumed to be 1 year old.

RESULTS

Age at breeding

The minimum numbers of kelp gulls present at Bird Island, Lambert's Bay and at Malgas Island at different ages, as well as the minimum numbers breeding at each age are shown in Table II. Most fledged chicks left the colonies at the end of the breeding season. No birds in their first year (<1 year old) were seen at Lambert's Bay outside the breeding season, and only two were seen at Malgas Island, one each in the winters of 1994 (August) and 1998 (June).

Seven birds aged between 1 and 2 years visited the

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Table I: Numbers of kelp gull chicks banded at Bird Island, Lambert's Bay, and Malgas Island, 1992/93–1997/98

Season	Lambert's Bay	Malgas Island
1992/93	25	25
1993/94	30	33
1994/95	36	38
1995/96	77	32
1996/97	112	45
1997/98	120	37

two colonies, but at least 14 birds of age 2 years were seen there (Table II). Assuming an annual survivorship of 0.8 (Crawford *et al.* 1991), the 2-year-olds would represent 17.5 birds aged 1. Hence, only 40% of 1-year-old birds visited the breeding colonies. Immature birds banded at Lambert's Bay in 1994/95 and 1995/96 were seen at Kleinsee seal colony (29°34'S, 17°00'E), 300 km to the north, on 21 December 1996, when aged 2 and 1 years old respectively, indicating that they may range substantial distances from their natal colony.

One 3-year-old bird banded at Lambert's Bay was at Malgas Island in April 1998; one 3-year-old banded at Malgas Island was at Lambert's Bay in November 1996. Neither was breeding. The distance between these two localities is 113 km.

At Malgas Island in 1997, one 3-year-old bird displayed aggressive behaviour to an observer, suggesting that it may have been holding territory (Higgins and Davies 1996), but it was not seen at a nest. At least 10 other birds of this age were not breeding when seen at the two islands.

The youngest age for which breeding was confirmed was four years. At least 50% of 4-year-old birds were breeding, but this proportion may have been higher (Table II). All kelp gulls older than four years were breeding.

Plumage

Photographs taken at Lambert's Bay on 3 November 1998 of birds aged 1, 2, 3, 4 and 6 years are shown in Figure 1. Also shown is a photograph of chicks mainly with fledging feathers, but with small amounts of down feathers, taken on 27 January 1993 at Ichaboe Island, Namibia (26°17'S, 14°56'E).

The chicks had dark feathers, with buff fringes on the scapulars, wing coverts and tail, and brown underparts. That half of the bill nearest the tip was black, the iris dark brown and the feet and legs grey-brown (Fig. 1a).

The two 1-year-olds had a lighter face, neck and

underparts than the chicks, and a pale tip to the bill, which was black behind this pale tip and grey-yellow nearer the face. The upper tail-coverts were pale, so that the tail had a dark terminal band. The legs and feet were pale grey (Fig. 1b–c).

The 2-year-olds both had a white head, neck and underbody, although one bird still had some brown mottling on the neck. There was no dark terminal band to the tail. The saddle was black, but the secondary coverts were brown. Both birds had a yellow bill, with black above the gonys and a pale tip. Red was just appearing at the gonys, particularly in the bird with the whiter neck. The legs and feet were a lighter grey than birds aged 1 year (Fig. 1d–e).

The birds aged 3 (Fig. 1f), 4 (Fig. 1g) and 6 (Fig. 1h) years were all similar in appearance, having a white head, neck, underbody and tail. The saddle and upper wing were slate black. The bill was bright yellow with a red spot at the gonys, and the legs and feet were mustard-yellow or yellow-green. The birds aged 4 and 6 had a broad white trailing edge to the secondaries and inner primaries, and four white spots on the outer primaries. These latter features were not evident for the 3-year-old gull.

DISCUSSION

Unfortunately, no birds that hatched in the 1993/94 breeding season were later observed breeding. The oldest age at which a bird from this year-class could be identified was nearly four years, in mid-September 1997, prior to the laying of clutches. It is likely that most plastic bands applied in 1993/94 had been lost by that date. At both Lambert's Bay and Malgas Island, several birds were regularly seen with uncoloured, stainless steel bands, indicating that plastic bands had been lost. Plastic bands are thought to eventually become brittle, through continued exposure to sunlight, and to fall off. This prompted the change in 1997/98 to use of coloured, stainless-steel bands. In Figure 1h, the red band on the 6-year-old bird has slipped over the metal band, indicating that it had become loose. However, several plastic bands remained on birds for four years or longer, so allowing the first breeding attempts of these birds to be observed.

The youngest age at which breeding was confirmed was four years. Birds from one cohort at Lambert's Bay and one at Malgas Island bred at this age (Table II). All older birds were breeding, but known-age birds were unlikely yet to have reached an age when senescence may play a role. A 3-year-old at Malgas Island exhibited territorial behaviour in November 1997, but no other birds aged three years or younger showed

Table II: Minimum numbers of kelp gulls from different cohorts present and breeding at Bird Island, Lambert's Bay and Malgas Island, at approximate ages. A ? under breeding signifies that breeding was not confirmed by associating the birds with a nest, but thought possible because the birds were seen inside the breeding colony. Note that sightings include age categories from the age indicated up to the next age. Therefore, 1-year-old refers to birds aged between one and two years. Based on information in Crawford *et al.* (1997), the birth date for all chicks, assumed equivalent to laying date, was taken to be 1 October

Cohort	1-year-old		2-years-old		3-years-old		4-years-old		5-years-old		6-years-old	
	Present	Breeding	Present	Breeding	Present	Breeding	Present	Breeding	Present	Breeding	Present	Breeding
<i>Lambert's Bay</i>												
1992/93	0	0	1	0	2	0	3	3?	2	2	1	1
1993/94	0	0	0	0	1	0	0	0	0	0		
1994/95	0	0	1	0	1	0	3	3				
1995/96	0	0	3	0	4	0						
1996/97	2	0	3	0								
1997/98	0	0										
<i>Malgas Island</i>												
1992/93	0	0	0	0	1	0	2	0	1	1	0	0
1993/94	0	0	1	0	0	0	0	0	0	0		
1994/95	2	0	2	0	1	1?	2	2				
1995/96	2	0	2	0	1	0						
1996/97	1	0	1	0								
1997/98	0	0										
Total	7	0	14	0	11	1?	10	8	3	3	1	1

signs of breeding. In New Zealand, Fordham (1964) observed a few instances of immature birds displaying breeding behaviour at the end of their second year, but thought that they were not breeding, or even mated.

The 3-year-old photographed at Lambert's Bay approached full adult plumage, but the less-developed spots on the outer primaries and lack of a white trailing edge to the secondaries and inner primaries suggest that birds of this age may not breed.

The age of first breeding in gulls varies, from two years for some smaller species to five years for some larger ones (Burger and Gochfield 1996). The kelp gull is a large gull (Maclean 1985), and defers breeding to a relatively late age. For a particular gull species, age at first breeding may vary. Factors that influence this parameter include availability of mates, of nesting sites and of nesting materials, body condition and food availability (Burger and Gochfield 1996). Both Lambert's Bay and Malgas Island have large colonies of Cape gannets *Morus capensis*, and often substantial numbers of Cape cormorants *Phalacrocorax capensis* (Rand 1963, Crawford and Dyer 1995). However, there is adequate space for kelp gulls to breed and sufficient nesting material. At the Isle of May, off the east coast of Scotland, age of first breeding by herring gulls *Larus argentatus* decreased from 6 years to 4.8 years, following intensive culling that reduced the breeding population to less than a quarter of pre-cull density (Coulson 1991). This was evidence

that age of first breeding was affected by nesting space.

Apart from the different iris colour noted by Brooke and Cooper (1979), southern African kelp gulls of different maturity stages generally match the descriptions of Higgins and Davies (1996) for the nominate race. However, brown streaking on the head and neck was not apparent in southern African birds aged 3 years, and their legs and feet approached the mustard-yellow colour of older birds. Brooke and Cooper (1979) noted that the most common leg colour for adult *L. d. vetula* is olive-grey. There is variation in plumage of southern African birds of the same age, as noted by Higgins and Davies (1996) for the nominate race. Fordham (1964) stated that, at five weeks, the whole bill of chicks was black with a tiny horn-coloured tip. The bills of the chicks in Figure 1a, which are probably at least that age, have only the anterior section black, with yellow closer to the face.

First-year kelp gulls leave their southern African natal colonies in the austral autumn or winter, prior to the return of adults for the spring breeding season (Crawford *et al.* 1997), and many do not return to the colony until they are 2-years old. By contrast, at a colony in Wellington Harbour, New Zealand, most first-year birds join roosting flocks of adults by May or June (Fordham 1964).

Although one pre-breeder from each colony where birds were banded was seen at the other, all breeders



Fig. 1: Photographs of (a) kelp gull chicks; (b and c) 1-year-olds; (d and e) 2-year-olds; (f) 3-year-old; (g) 4-year-old; and (h) 6-year-old. The chicks were photographed at Ichaboe Island on 27 January 1993 and all other birds at Lambert's Bay on 3 November 1998



Fig. 1: (continued)

nested at their natal colony. Because most gulls are monogamous (Burger and Gochfield 1996), and hence will show fidelity to breeding localities, it can be expected that these adults will continue at their natal colonies.

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LITERATURE CITED

- BROOKE, R. K. and J. COOPER 1979 — The distinctiveness of southern African *Larus dominicanus*. (Aves: Laridae). *Durban Mus. Novit.* **12**(3): 27–37.
- BURGER, J. and M. GOCHFELD 1996 — Family Laridae (gulls). In *Handbook of the Birds of the World. 3. Hoatzin to Auks*. Del Hoyo, J., Elliott, A. and J. Sargatal (Eds). Barcelona, Lynx Edicions: 572–623.
- COULSON, J. C. 1991 — The population dynamics of culling herring gulls and lesser black-backed gulls. In *Bird Population Studies. Relevance to Conservation and Management*. Perrins, C. M., Lebreton, J-D. and G. J. M. Hirons (Eds). Oxford: University Press: 479–497.
- CRAWFORD, R. J. M., COOPER, J. and P. A. SHELTON 1982 — Distribution, population size, breeding and conservation of the kelp gull in southern Africa. *Ostrich* **53**(3): 164–177.
- CRAWFORD, R. J. M. and B. M. DYER 1995 — Responses by four seabird species to a fluctuating availability of Cape anchovy *Engraulis capensis* off South Africa. *Ibis* **137**: 329–339.
- CRAWFORD, R. J. M., DYER, B. M. and R. K. BROOKE 1994 — Breeding nomadism in southern African seabirds – constraints, causes and conservation. *Ostrich* **65**(2): 231–246.
- CRAWFORD, R. J. M., NEL, D. C., WILLIAMS, A. J. and A. SCOTT 1997 — Seasonal patterns of abundance of kelp gulls *Larus dominicanus* at breeding and non-breeding localities in southern Africa. *Ostrich* **68**(1): 37–41.
- CRAWFORD, R. J. M., RYAN, P. G. and A. J. WILLIAMS 1991 — Seabird consumption and production in the Benguela and Western Agulhas ecosystems. *S. Afr. J. mar. Sci.* **11**: 357–375.
- FORDHAM, R. A. 1964 — Breeding biology of the southern black-backed gull. 2. Incubation and the chick stage. *Notornis* **11**: 110–126.
- HIGGINS, P. J. and S. J. F. DAVIES (Eds) 1996 — *Handbook of Australian, New Zealand & Antarctic birds. 3. Snipe to Pigeons*. Melbourne; Oxford University Press: 1028 pp.
- MACLEAN, G. L. 1985 — *Roberts' Birds of Southern Africa*. Cape Town; John Voelcker Bird Book Fund: lii + 76 Plates + 848 pp.
- RAND, R. W 1963 — The biology of guano-producing sea-birds. 4. Composition of colonies on the Cape islands. *Investl Rep. Div. Sea Fish. S. Afr.* **43**: 32 pp.