

Molts and Plumages of Ontario's Heermann's Gull

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A Heermann's Gull (*Larus heermanni*) in Toronto, Ontario, provided a singular opportunity to study closely an individual for several days each week for 9 months from early December 1999 to 16 September 2000. The record of this Heermann's Gull was fully documented by Yukich (2000) and Roy (2000). This paper describes the Prealternate I and Prebasic II molts of a second calendar year Heermann's Gull. Tables 1 and 2 are bar graphs showing the respective Prealternate I and Prebasic II molts. Figures 1 to 9 are photographs showing significant stages of the molts and plumages in chronological order. Information is also provided on soft part colours.

MOLTS AND PLUMAGES

Normal molting or molt is the growth of new feathers, which pushes out the old feathers. It includes both the shedding and replacement of feathers. In this study, we use the terminology of Humphrey and Parkes (1959) to describe the names of molts and plumages. The Humphrey and Parkes terminology is recommended to describe precisely a bird's plumages and molts. See Pittaway (2000) for a detailed comparison of Humphrey and Parkes with the general terms of molt and plumage.

Basic I Plumage

This plumage is acquired by a partial Prebasic I molt of the head, body, and scapular feathers. The wings and tail are retained from the Juvenal plumage. Note: a few apparently new median secondary coverts were present on the outer wing in December, which we consider a variable extension of the Prebasic I molt. When the Heermann's Gull was first seen well and photographed in early December 1999, it had mostly completed its Prebasic I molt as shown in Figure 1. It had new brownish grey Basic I head and body feathers, scapulars, and a few apparently new median coverts. These newer and greyer feathers contrasted with the worn and faded browner Juvenal wing coverts and tertials on the perched bird.

Alternate I Plumage

This plumage was acquired from mid-January to mid-July by a partial Prealternate I molt of the head and body feathers, and the scapulars. This molt appears to be less extensive than the Prebasic I molt. See Table 1 for a bar graph of the Prealternate I molt.

Head: Molt began in mid-January. By early February, the Heermann's Gull

had new white throat feathers, and the eye crescents were whiter. There was a gradual increase in the number of white feathers on the head and face from January to July. The head was its whitest from mid-June to early July. See Figure 5. The scattered whitish Alternate I feathers were noticeably worn in mid-July.

Body: In mid-February, many new dusky grey Alternate I body feathers were mixed with worn and faded brown Basic I feathers. By mid-May, all body feathering was the same dusky grey colour.

Scapulars: In February and March, new dusky grey scapulars were mixed with the old worn and faded brown Basic I scapulars. All new dusky grey Alternate I scapulars had fully grown by late May. See Figure 3. One long pale-tipped posterior scapular (subscapular), forming part of the scapular crescent, appeared on each side in late March. See Figure 2. In early May, one more pale-tipped scapular on each side grew from underneath the earlier pale-tipped scapulars.

Basic II Plumage

This plumage is acquired by a complete Prebasic II molt from mid-February to September. When the Heermann's Gull was last seen on 16 September 2000, it had essentially completed molting to its dusky greyer Basic II plumage. The Ontario Heermann's in September

(Figure 7) was very similar to the bird in the black-and-white photo number 469 in Grant (1986). See Table 2 for a bar graph of the Prebasic II molt.

Head: From mid-July to mid-August, many worn white-tipped and browner Alternate I feathers were replaced by new greyish Basic II feathers. Wear probably contributed to the loss of some white-tipped feathers. By early September, the head feathering was a mixture of mostly new greyish feathers and a few scattered older brownish ones. The throat and forehead were still whitish.

Body: Most molting occurred from mid-August to at least mid-September, when slightly faded brownish-grey Alternate I feathers were replaced with dusky, greyer Basic II feathers. On 14 September, the bird was still preening whitish sheaths off newly grown feathers. Like the head, the body plumage was a mixture of older brownish grey and newer dusky grey feathers, with the newer grey feathering predominant.

Scapulars: Molting extended from early July to 15 September, replacing most Alternate I scapulars with Basic II scapulars. In mid-July, two ages of feathers were obvious, older worn faded grey Alternate I mixed with new dusky grey Basic II scapulars. On 3 July, new white-tipped posterior scapulars (subscapulars)



Figure 1: Basic I plumage on 2 December 1999, showing molt contrast of older, worn, brownish Juvenal wing coverts and tertials, with newer fresh greyish Basic I head, body, and scapular feathers. Photo by *Sam Barone*.



Figure 2: Alternate I long, pale-tipped, posterior scapulars (subscapulars) on 30 March 2000. Compare with Figure 6. Photo by *Jean Iron*.

emerged on each side from under the two older pale-tipped Alternate I scapulars, followed by another pair of white-tipped scapulars on 6 July. On 7 August, another new white-tipped feather emerged on each side. Between then and 15 September, on each side, the two older worn Alternate I pale-tipped scapulars were replaced with new bright white-tipped dusky grey feathers, forming a conspicuous white scapular crescent on the perched bird. See Figure 6.

Primaries: These are the large outer wing feathers attached to the manus (hand) of the wing. Gulls have 11 primaries, but the tiny rudimentary outermost Primary 11 or remicle is not treated here. The short form P is used here for primary/primaries. The primaries are numbered and molted from the inner P1 outward to the long outermost P10 in a descendant sequence. The completion in growth of P10 usually is considered to be the end of the Prebasic II molt in gulls. Primary molt in the Heermann's Gull started with the shedding of very worn and faded brownish-black Juvenal P1 and P2 at the end of April 2000 and continued until the new dark greyish-black P10 finished growing in before mid-September, a period of over 4 months. The primaries molted sequentially from P1 to P10. See Figure 4. On 3 July, the old very worn and faded P10 shed on the right, and on 4 July, the old P10 shed on the left. The new dark grey-

ish-black P10 had completely grown by 15 September. See Figure 9. The new Basic II primaries were a dark greyish-black and contrasted with the paler dusky grey body, tertials, coverts and scapular feathers. In flight, the bird seemed to be a uniform dark grey, almost black, but when perched the difference between the darker flight and tail feathers and the paler grey of the rest of the feathers was obvious.

Secondaries: These are the large wing feathers attached to the ulna between the wrist and the elbow, forming a continuous series with the primaries. We estimated 21 secondaries on each wing, which included 5 differently shaped tertials. The tertials are discussed and numbered separately below. The short form S is used for the secondary/secondaries. Molting of the secondaries occurred from early June to early August for S1 to S16. The secondaries are numbered and molted in an ascendant order from the outermost inward toward the body, from S1 to S16. Secondary molt started in early June with the shedding of the old very worn brownish-black Juvenal S1. By 25 June, the new dark greyish-black S1 was 75% grown and there was a large gap from S2 to about S9. By 3 July, all the old worn Juvenal secondaries had molted out. The new dark greyish-black Basic II secondaries 1-16 had fully grown by 2 August. The new Basic II secondaries were the same dark greyish-black



Figure 3: New dark grey Basic II median coverts and Alternate I scapulars on 25 May 2000. Photo by *Jean Iron*.



Figure 4: Heavy primary molt on 11 June 2000, showing new Basic II primaries 1-6, with primaries 5 and 6 partly grown, primary 7 shed, and primaries 8-10 being retained Juvenal feathers. White quill bases of the primaries show where primary coverts have shed. Browner secondaries have not yet molted. Photo by *Jean Iron*.

colour as the Basic II primaries, and contrasted with the other feathers, especially the paler grey tertials.

Tertials: The tertials are the innermost secondaries when they differ in shape, colour or molt pattern from the other secondaries. The short form T is used here for tertial(s). Many birds have three tertials, but gulls have at least five tertials, which are most noticeable when stacked fan-like on perched birds. They are numbered ascendantly, T1 to T5 inward from S16. The Heermann's Gull's tertials differed in colour from the secondaries. Prebasic II molt of the Heermann's Gull's tertials occurred from mid-May to late July. All old worn faded brown Juvenal tertials molted out by late June. The pale-tipped dusky grey replacements started growing in mid-May. By early July, there were 5 new pale-tipped tertials. Note: from mid-August to the end of the gull's stay in mid-September, two, probably three, new whitish-tipped tertials replaced some Basic II tertials, indicating a Presupplemental molt. See Figure 8.

Greater Secondary Coverts: These consist of one row of large coverts overlying the bases of the secondaries. The outer webs of the greater coverts are exposed and overlap one another in the same direction as the secondaries and primaries. Molting took place from early April to late June as follows:

- 9 April: very worn and faded brownish Juvenal greater coverts; looked like 1 or 2 missing.
- 30 April: several old greater coverts were missing on right, and 1 or 2 on left.
- 20 May: larger gaps where old greater coverts were missing, exposing the white bases of the secondaries.
- 31 May: all worn and faded brownish Juvenal greater coverts had molted out.
- 8 June: 4 new dusky grey greater coverts (same colour as other coverts, slightly paler than secondaries and primaries) coming in at the front, then in the centre.
- 8-23 June: new dusky grey feathers growing in from body side out, uneven in length.
- 28 June: all new dusky grey Basic II greater coverts appeared fully grown.

Median Secondary Coverts: Molting occurred from mid-February to June. In this study, we treat median coverts as two rows, lower and upper, above the greater coverts. In Heermann's Gull, the two rows of medians overlap in the same direction as the greater coverts. The lower row consists of larger feathers, whereas the feathers of the upper row are smaller, but noticeably larger than the lesser coverts above. The medians also molted differently than the other coverts, hence our separate treatment. Loose old worn brownish median coverts were pushed out by



Figure 5: Scattered Alternate I whitish head feathers and eye crescents on 30 June 2000. Some whitish feather tips have worn off. Photo by *Jean Iron*.

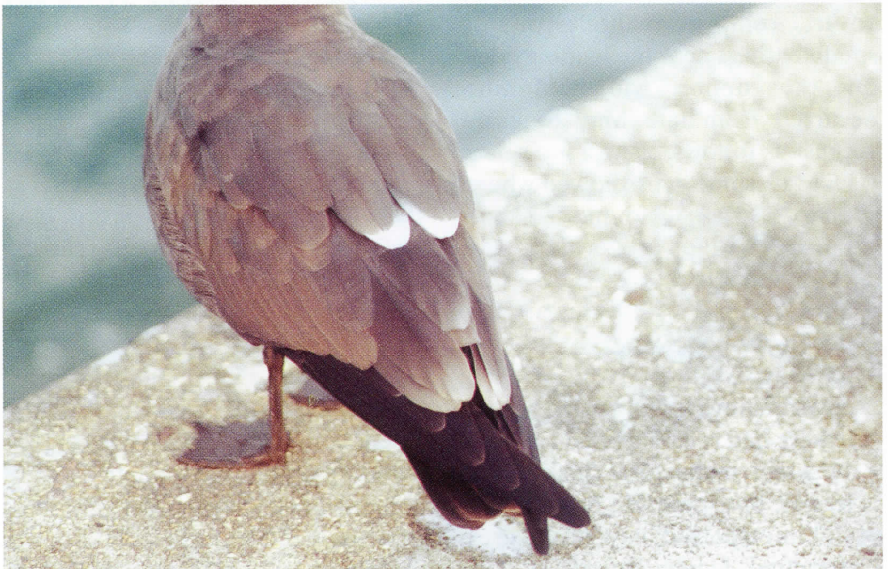


Figure 6: Long Basic II white-tipped posterior scapulars (subscapulars) on 26 August 2000. Compare with Figure 2. Photo by *Jean Iron*.

new grey medians during mid-February to April, often showing obvious gaps on the folded wings. On 2 May, there were two new lower medians on the right wing. On 3 May, a gap on the right side showed where old medians were missing. On 11 May, more new lower medians were growing. By 20 May, there was an almost complete row of lower medians on each side. See Figure 3. On 14 June, the upper row of new medians was growing. By 29 June, all new grey median coverts were fully grown. Note: some new medians replaced the Basic II medians during August and September, indicating a Presupplemental I molt. See Supplemental I Plumage below.

Lesser Secondary Coverts: The lesser coverts, including marginal coverts, comprise multiple rows of small feathers near the leading edge on the upper wing. Molting occurred from late May to early August as follows:

- 25 May: some gaps showed where older feathers had molted, and the remaining feathers were very worn and faded brown.
- 28 May: many new dusky grey lessers were growing.
- 30 May: white bases of median coverts showing where old brown lessers had recently shed.
- 11 June: many new dusky grey lessers, but some old brown ones still interspersed; new dusky grey marginal lesser coverts at the leading edge of the wings were

growing at the same time.

- 30 June: mostly new dusky grey, but still a small narrow partial row of old worn brown lesser coverts.
- 2 August: all new dusky grey Basic II lesser coverts had grown.

Greater Primary Coverts: These are one row of feathers covering the bases of the primaries. The short form P denotes primary/primaries below. Molting of greater primary coverts occurred from late April to early August as follows:

- 25 April: old worn and faded brown primary coverts over P1 and 2, and possibly P3, were missing.
- 29 May: new dusky grey primary coverts covered bases of P1-3.
- 11 June: new dusky grey primary coverts covered bases of P1-6. See Figure 4.
- 30 June: new dusky grey primary coverts covered bases of P1-8, but there was still an old worn brown Juvenal covert over P10.
- 2 August: all new dusky grey Basic II greater primary coverts noted.

Median Primary Coverts: These cover the bases of the greater primary coverts. The short form P is used below for primary/primaries. Molting occurred from late April to early August as follows:

- Molt in old worn median primary coverts occurred first in those feathers above P1-3 and P7 and



Figure 7: Basic II plumage on 7 September 2000. New grey median coverts and some new tertials indicate a probable Supplemental I plumage. Photo by *Jean Iron*.



Figure 8: Arrow indicates new, whitish-tipped tertial growing on 7 September 2000, which is apparently part of the Presupplemental I molt. Photo by *Jean Iron*.

P8, later over P4, 5, and 6, and lastly above P9 and P10.

- 30 April: small gaps where a few old worn brown median primary coverts were missing.
- 30 May: more gaps where old brown median primary coverts were missing.
- 1 July: new dusky grey median primary coverts were growing above P1-3 and 8; missing old brown coverts above P4-7; and old worn brown ones still above P9 and P10.
- Early August: all new dusky grey median primary coverts appeared fully grown.

Tail: Gulls have 12 tail feathers. Molt started in mid-May with the shedding of the old very worn and faded brownish Juvenal tail feathers, with new dark greyish-black feathers growing in simultaneously, left and right from the centre. On 1 July, there were 6 new dark grey-black central feathers growing. On 8 August, the tail appeared fully grown.

Supplemental I Plumage

During the Prebasic II molt, some tertials and median coverts were replaced twice, indicating a limited Presupplemental I molt.

Tertials: From mid-August to the end of the gull's stay in mid-September, two, possibly three, new whitish-tipped tertials on each side replaced the Basic II ones that had grown during May through July. See Figure 8.

Median Coverts: On 13 August 2000, there were several new median coverts on the right wing. On 17 August, 4 or 5 new ones were growing on the left wing. By 1 September, there was almost a complete lower row of new, darker, dusky grey median coverts. On 5 September, new median coverts started to grow in the upper row. By 15 September, there was one complete lower row of new medians, plus some new ones in the upper row. See Figure 7.

Soft Part Colours

Bill: From December 1999 to early March 2000, the base of the bill was pinkish, with the black tip more extensive on the lower mandible. The bill became more intensely pink in mid-March. From mid to late April, the bill base became more orange. The bill gradually changed colour to mostly orange, with a black tip. By late August, the bill had changed again to greenish at the base of the upper and lower mandibles; the remainder was orange with a black tip on the upper mandible, and more extensive black on the lower, with the extreme tip a white-bone colour.

Gape: The gape of the mouth was a soft pink.

Mouth: The lining of the mouth was pink (Yukich 2000).

Legs and feet: They were a dark charcoal grey to black.

Irides: They were mid-brown in colour, appearing black at a distance.

DISCUSSION

We examined a skin of a second year Heermann's Gull in Basic II plumage in the Canadian Museum of Nature. This bird was collected on 5 September 1923 at Morro, California. It was still growing Primary 10, which was 2.5 cm shorter than Primary 9. We estimated that its Prebasic II molt was about 2 weeks behind the Ontario bird. Jon King (pers. comm.) reported molt data for Heermann's Gulls in the Museum of Vertebrate Zoology, Berkeley, which indicated that the Ontario bird was very similar in both molt timing and duration to birds in California.

The Heermann's Gull molted almost continuously during the 9

months from December 1999 to mid-September 2000. See Tables 1 and 2. Howell and Corbin (2000), in a study of Western Gulls (*L. occidentalis*), reported "molt appears to be more or less continuous for at least the first two years" of life.

After the Basic I plumage was acquired (which apparently included a few median coverts), some tertials and median coverts molted two more times. After Basic I, we considered the first molt of the tertials (five on each wing) and median coverts to be part of the Prebasic II molt, and the second molt of some tertials and median coverts after mid-August to be a Presupplemental I molt. Another interpretation is that the first molt of the tertials and median coverts was part of the Prealternate I molt, and the second molt was part



Figure 9: Fully grown Basic II primaries on 15 September 2000. Photo by Jean Iron.

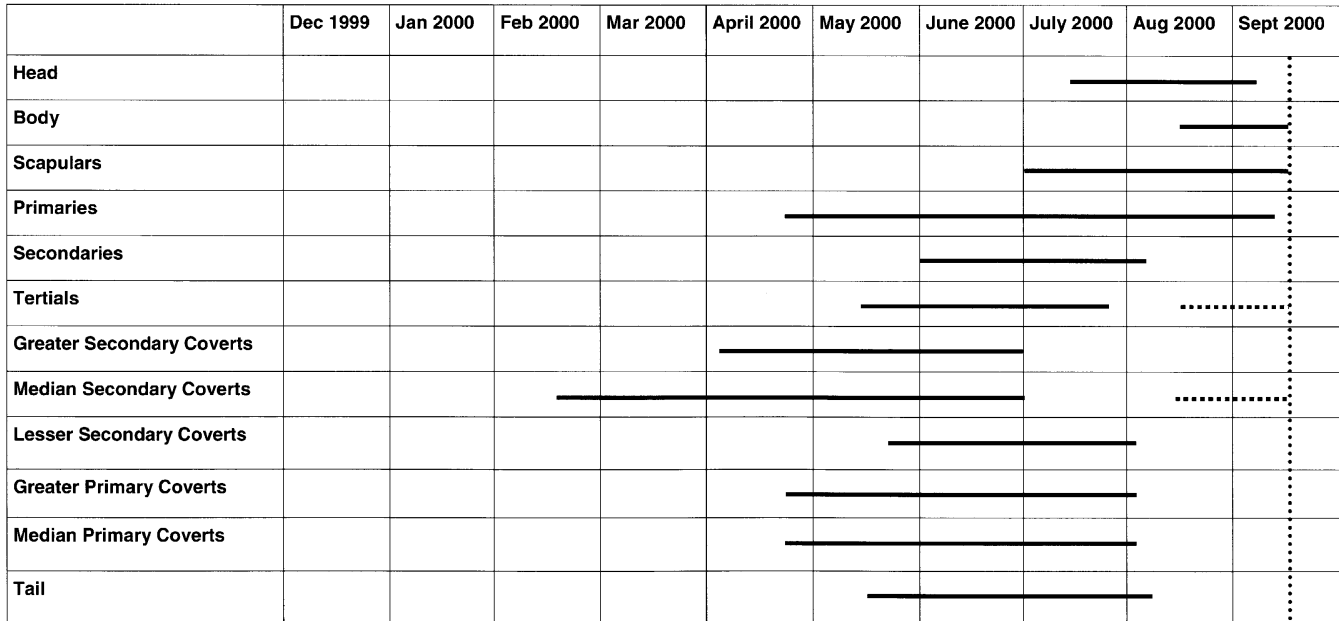
Table 1: Prealternate I Molt in Heermann's Gull

	Dec 1999	Jan 2000	Feb 2000	Mar 2000	April 2000	May 2000	June 2000	July 2000	Aug 2000	Sept 2000
Head		—————								
Body			—————							
Scapulars			—————							
Primaries										
Secondaries										
Tertials										
Greater Secondary Coverts										
Median Secondary Coverts										
Lesser Secondary Coverts										
Greater Primary Coverts										
Median Primary Coverts										
Tail										

————— Indicates Prealternate I Molt.

Vertical dotted line indicates 16 September 2000 when the Heermann's Gull was last observed in Toronto, Ontario.

Table 2: Prebasic II Molt in Heermann's Gull



————— Indicates Prebasic II Molt. Indicates Presupplemental I Molt.

Vertical dotted line indicates 16 September 2000 when the Heermann's Gull was last observed in Toronto, Ontario.

of the Prebasic II Molt. More study is needed over a longer period of time to determine the full story of molts and plumages in second calendar year Heermann's Gulls.

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in the Museum of Vertebrate Zoology, University of California, Berkeley, and he thanks Carla Cicero for access to that collection.

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