NOTES ON MEASUREMENTS, MORTALITY, MOLT, AND GONAD CONDITION IN FLORIDA WEST COAST LAUGHING GULLS

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The Laughing Gull (*Larus atricilla*) is the common small gull of the Southeastern sea coast of the United States, yet few published data on its measurements, molt and gonad cycle exist. Between 1974 and 1976 we obtained 390 individuals that died at the Suncoast Seabird Sanctuary, Pinellas County (hospital sample), most coming from Pinellas County, Florida west coast. We also captured 39 adults in a breeding colony on the Bayway of Pinellas County (healthy sample) (Dinsmore and Schreiber 1974; Schreiber, Schreiber, and Dinsmore 1979). These gulls provide a reasonable sample for morphological data.

Measurements. On as many of these specimens as feasible we measured the exposed culmen and external tarsus to the nearest 1 mm with a dial calipers, the wing chord (unflattened) and tail with a meter stick, and weight with a Pesola spring balance accurate to 1 g. Many individuals had only one wing, the other having been amputated, in an attempt to save the birds' life, and thus weight could not be determined accurately. We also have no data on the length of time individuals were in captivity before they died. We received no birds in November through January but in our sample of 11 to 25 individuals per month from April 1974 to June 1976 no significant ($P < 0.05$) seasonal changes in measurements were apparent in culmen length (2.2 mm range between months), wing chord (31 mm range), tarsus (3.2 mm range), or weight (45 g range). Thus we summarize all measurement data in Table 1. Adult males averaged slightly larger than adult females in all measurements taken, but none of the differences are statistically significant at the 0.05 level. Similarly, birds less than one year old (by plumage) were somewhat smaller than adults of the same sex, with wing length and weight being most different, but still not statistically so.

Our small unsexed sample of "healthy" adults captured on nests with three eggs showed culmen and tarsus lengths very similar to those found for the "hospital" sample but they had longer wings, apparently because the primaries were less worn. These individuals were also significantly heavier than the birds from the hospital (t test, $P < 0.001$). Our measurements did not allow us to sex the Laughing Gulls based on external measurements but perhaps a more extensive series of measurements (including bill depth and width, skull length, etc.) would have (Shugart 1977). It is obvious from these data that weight must be taken from "healthy" birds but the culmen and tarsus measurements from the "hospital" birds are an accurate measure of the size of this species. Since feathers are liable to wear excessively in captivity, the tail and wing length measurements on specimens from animal hospitals should not be used for comparative purposes.

Comparisons made between our data and those of Dwight (1925), repeated

Table 1. Measurements (in mm & g) of Laughing Gulls from the Florida West Coast.

From Suncoast Seabird Sanctuary

	Adult Males				Adult Females			
	$\bar{x}$	n	range	± 2 SE	$\bar{x}$	n	range	± 2 SE
Culmen	40.5	184	34-46	0.33	38.4	130	35-44	0.57
Wing	322.8	177	250-352	2.56	312.2	124	263-340	1.18
Tarsus (external)	59.7	184	52-66	0.34	56.7	130	48-63	0.40
Tail	122.6	31	100-140	2.98	114.9	20	94-130	3.35
Weight	249	125	150-345	5.51	224	74	150-300	12.75
	Males less than 1 year				Females less than 1 year			
Culmen	39.5	54	34-42	0.59	37.9	22	31-43	1.08
Wing	306.5	53	248-334	4.36	306.8	22	270-325	5.76
Tarsus (external)	58.9	54	53-64	0.78	56.6	22	53-63	0.55
Weight	204	26	137-300	15.84	178	22	140-272	7.38

From live adults captured on 3 egg clutches on the Bayway, Pinellas County

	$\bar{x}$	n	range	± 2 SE
Culmen	40.2	39	36-44	0.76
Wing	337	5	315-360	9.03
Tarsus (external)	58.4	39	53-65	0.89
Weight	325	39	270-400	5.09

in Murphy (1936), and Ridgway (1919), repeated in Blake (1977), give remarkably similar results except for the longer wings and tail in those museum specimens. The collection site of those specimens presumably was mainland North America. Voous (1957) followed Parkes (1952) in recognizing the smaller size of the West Indian Laughing Gulls and those measurements of wing and tail are shorter than our sample. Oberholser (1974) presented additional information on the size of gulls, presumably from Texas, and from the West Indies, but did not give his sample size. His measurements for the Texas birds are similar to those presented here, with males from the West Indies somewhat smaller. The racial separation of this species is not recognized by the A.O.U. Check-list (1957).

Table 2. Causes of mortality in Laughing Gulls.

	Adult		Juvenile	
	Male	Female	Male	Female
Wing broken or amputated	64	45	9	8
(percent of total)	(55%)	(66%)	(42%)	(57%)
No external damage	7	4	2	0
Dead on arrival	3	2	0	0
Sick	34	13	10	6
Hit by car	4	2	0	0
Monofilament line	4	1	0	0
Oiled	1	1	0	0
(percent of total)	(45%)	(34%)	(58%)	(43%)
Total	117	68	21	14
Aspergillosis sp. present	27	18	9	10
(percent of total)	(23%)	(26%)	(43%)	(71%)

Clearly, additional data on comparable measurements from throughout the range of this species are needed for further consideration, especially from the northern portion and in the apparent region of overlap between the northern and southern forms, in the Caribbean and along the western and southern Gulf of Mexico.

Mortality. Our data on mortality are summarized in Table 2. The causes of death, or at least the reason the birds were brought to the sanctuary, were determined from data supplied with the specimens and were not available for all birds. The majority of the birds that died had broken wings. Proportionately more females suffered from wing damage than males and in both sexes of adults wing damage was the major injury. Most wings probably are broken through collision with telephone or electricity wires. This form of mortality would be significantly decreased if all such wires were underground. The effect of such apparent high mortality on the gull population should be investigated before suggesting such expensive (yet esthetically pleasing) alterations. A high proportion of the juveniles were noted as being "sick" on the specimen label, which generally meant that they were weak and could not fly. It may be that these young birds were ones that never learned to feed efficiently and were merely starving. There was a high incidence of *Aspergillosis* in young birds (54%) compared with the adults (24%). We do not know if the birds contracted this disease after being taken into captivity or while in the wild and unfortunately it is impossible to separate starvation from disease in wild populations. Death due to entanglement in monofilament line or oiling did not seem to be important in Laughing Gulls in this sample and this was borne out by our observations of birds in the nesting colony. A high percentage of birds (37%) died from unknown causes (found sick, DOA, or no external damage).

The fungal genus *Aspergillosis* contains some 300 species which are among the most common fungi in all environments, especially in decaying organic

Table 3. Primary molt score for one wing of Adult Laughing Gull.

	Males			Females		
	$\bar{x}$	n	range	$\bar{x}$	n	range
February	0	8		0	9	
March	0	4		0	5	
April	0	4		0	7	
May	7	6	1-15	0	3	
June	3	3	1- 7	-	0	
July	10	8	4-21	8	6	4-12
August	25	18	8-41	25	13	6-37
September	34	14	21-45	34	11	30-50
October	39	11	33-50	44	6	40-47
Total		76			60	

debris. *A. fumigatus* accounts for most avian fungal disease. It is transmitted by spores and is manifested in birds through granulomatoses (gray-green nodules) in the lungs and mesentaries. Treatment with antibiotics reduces the ability of the host's immunologic response to resist the fungi (Rippon 1974). The high level of infection in these birds gives warning about the prevalence of this disease in captive conditions and cause for concern about sanitary measures in captivity. This must be considered when attempts are made to release birds back into the wild which have been thus exposed.

Molt. We recorded molt on many of the specimens examined and while we do not have a full year's sample, the data available do show the molt pattern of the adult birds in this region. We used the Ashmole (1962) molt score method to quantify primary molt (Table 3), with a score of 50 indicating all new feathers in one wing and a 0, all old feathers. In 22 birds in which we examined both wings for molt, the pattern was the same in both wings. Molt is regular from the inner primaries outward, it may begin somewhat earlier in males than in females and both sexes molt the primaries mainly in August through October. This timing is similar to the pattern determined from feathers found shed in the colony (Dinsmore and Schreiber 1974). Thus molt begins as the breeding season ends and requires approximately three months, although study of individual birds is needed. Clearly, in this species in Florida, molt and breeding are non-overlapping. We recorded insufficient data on secondary and rectrix molt to analyze but it appears that molt of those feathers begins somewhat later and proceeds later into the fall than does the primary molt. All adults were molting the black head feathers by August in this sample.

Gonads. Our sample of gonad measurements does not include any birds from November through April and thus we are unable to determine the annual cycle. However, the means of our sample of 10 to 16 males for each month from July through October varied from 8 × 4 mm, 7 × 3 mm, 6 × 2 mm and 5 × 3 mm with none larger than 12 × 6 mm, showing a slight decrease in volume through the summer. The samples of 8 to 15 females for each month from June through October varied between 10 × 5 mm, 11 × 6 mm, 12 × 5 mm, 10 × 5 mm and 14 × 5 mm, with the largest ova present 5 mm. The ovary seems to increase in size in October compared to August and September, perhaps indicating gonadal recovery in the fall. However, the effects of captivity on our gonad data are unknown and additional data on the gonadal cycle in this species are needed.

Conclusions and Suggestions. We believe that important biological data can be gathered from studies of dead birds available from the various bird hospitals in Florida and other states. We urge interested individuals to avail themselves of this opportunity to study a readily available source of wild birds, realizing the possible biases in the samples. This source of birds is especially valuable in light of the difficulties of collecting specimens imposed by the various permit regulations in effect today.

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