

NOTES ON THE WING AND TAIL MOLT OF THE SCREAMERS, THE SUNBITTERN, AND IMMATURE GUANS

JÜRGEN HAFER

IN their recent comprehensive survey of the molt of birds E. and V. Stresemann (Die Mauser der Vögel, *J. f. Orn.*, 107, Sonderheft, 1966) show the significance of comparative studies of plumage changes. Among the many families of birds they discuss in this monograph, the Stresemanns had insufficient material to determine the molt sequence of wing and tail feathers for only a few small groups. While studying the collection of the Instituto de Ciencias Naturales, Universidad Nacional, Bogotá (Colombia), the Phelps collection in Caracas (Venezuela), and the collections of the American Museum of Natural History, New York, I recorded data on the wing and tail molt of the Screamers (Anhimidae), the Sunbittern (*Eurypyga helias*), and of immature Guans (Cracidae) that supplement the Stresemanns' findings.

ACKNOWLEDGMENTS

I am very grateful to L. E. Mora-Osejo and Father Antonio Olivares who permitted me to use freely the collection of the Instituto de Ciencias Naturales, Universidad Nacional, Bogotá (Colombia). My thanks are also due to William H. Phelps and Dean Amadon for allowing me to study the Phelps collection in Caracas (Venezuela) and the collections of the American Museum of Natural History, New York, respectively. Professor E. Stresemann very kindly read and criticized the manuscript.

METHODS

The primaries are counted from the carpal joint outward, the innermost primary being P1. The outermost secondary is S1. The rectrices are counted from the central pair (R1) outwards.

Abbreviations used in the scheme for reporting the condition of feathers in molting specimens:

- P, primary; S, secondary; R, rectrix; l, left; r, right.
old feather of preceding molt cycle, often worn and faded; given in roman type.
new feather of new molt cycle; new and growing feathers are given in *italics*.
y young; incoming feather shorter than approximately half of its final length.
adv advanced; incoming feather longer than approximately half of its final length.
a, b first and second generation of contour feathers in a juvenile bird.
ICN Instituto de Ciencias Naturales, Universidad Nacional, Bogotá, Colombia.
Caracas Phelps collection, Caracas, Venezuela.

SCREAMERS (ANHIMIDAE)

HORNED SCREAMER (*Anhima cornuta*) AND NORTHERN SCREAMER (*Chauna chavaria*)

Primaries.—I have examined 7 adult specimens in molt (4 *Anhima cornuta* and 3 *Chauna chavaria*) from Colombia and Venezuela. These

birds are in early and middle stages of the wing molt. All of them have new inner primaries and one to three growing middle or outer primaries in the wing. The molt of the primaries apparently began with the replacement of the innermost (first) primary and followed a regular descending sequence outward on early stages: 1-2-3 or 1-2-3-4 (*Anhima cornuta* no. 10176, 0376, 0377; *Chauna chavaria* 0379). This orderly growth of the primaries is not found on later stages of the wing molt when the outer primaries seem to be replaced in no regular sequence. This is particularly obvious in *Chauna chavaria* no. 0378. In this bird the descending molt wave has reached the fifth primary in the left wing. In the right wing of this same bird only P1, P2, and P3 have been replaced in the descending mode followed by the irregular shedding of P6 and P10 (instead of P4 and P5 as in the left wing). The other specimens examined also indicate a descending sequence on early stages of the wing molt (inner primaries) followed by an irregular replacement of the middle and outer primaries.

E. and V. Stresemann (*ibid.*: 306-307) examined three specimens that also had two or three growing primaries in the wing. These authors already concluded that the primaries are not replaced in a simple descending order.

Rectrices.—The rectrices apparently are replaced in no regular sequence.

Records:

Anhima cornuta

18 January 1941, ♂, Santa Barbara, Venezuela, Caracas-10176

Pl 1-2 new, 3 y, 4-9 old, 10 y

r 1 new, 2 adv, 3-9 old, 10 adv

3 April 1946, ♂, Loretoyacu, Dep. Amazonas, Colombia, ICN-0376

Pl, r 1-3 new, 4 adv, 5-10 old

17 August 1947, ♂, Tres Esquinas, Dep. Cádiz, Colombia, ICN-0377

Pl, r 1-3 new, 4 adv, 5-10 old

Rl 1 old, 2 adv, 3 old, 4-5 new, 6 old

r 1 adv, 2 old, 3 new, 4 y, 5 new, 6 old

8 February 1939, ♂, Piacoa, lower Río Orinoco, Venezuela, Caracas-3320

Pl 1-3 new, 4-7 old, 8 adv, 9 old, 10 adv

r 1-3 new, 4-6 old, 7 missing, 8 adv, 9 old, 10 new

Chauna chavaria

23 January 1947, ♂, Puerto Giraldo, Dep. Atlántico, Colombia, ICN-0379

Pl, r 1-2 new, 3-8 old, 9 adv, 10 old

Rl 2 adv, others old

r 3 adv, others old

28 February 1940, ♂, Barranquilla, Dep. Atlántico, Colombia, ICN-0378

Pl 1-3 new, 4-5 y, 6-10 old

r 1-2 new, 3 adv, 4-5 old, 6 adv, 7-9 old, 10 adv

29 April 1940, sex ?, Altamira, Trujillo, Venezuela, Caracas-7550

PI 1 *adv*, 2-5 *new*, 6 *adv*, 7-10 *old*

r 1-5 *new*, 6 *adv*, 7-9 *old*, 10 *adv*

SUNBITTERN (EURYPYGIDAE)

SUNBITTERN (*Eurypyga helias*)

Primaries.—The molt of the primaries generally follows the normal descending mode according to my records of 22 molting birds. In these specimens only one incoming feather was present in each wing at the time the birds were collected. Old and new feathers could usually be distinguished on the basis of wearing and fading. In two specimens of the Bogotá collection E. and V. Stresemann (*ibid.*: 161) mention, I found two primaries growing simultaneously in the wing. In these and two other specimens the Stresemanns list, more distal feathers may have been shed out of sequence. On the basis of these irregularities the Stresemanns assumed that the Sunbittern molts its primaries in no regular sequence. Verheyen (*Gerfaut*, 48: 101-114, 1958) states that the molt of the primaries follows an ascending order, which is contradicted by my findings.

The populations inhabiting northern South America seem to molt during the second half of the year, as all molting birds from this region have been collected between July and January, and 23 specimens from Colombia and Venezuela taken between February and May show no wing molt. This distribution over the year of molting and nonmolting birds makes it very unlikely that the Sunbittern has a continuously progressing wing molt (kontinuierliche Staffelmäuser) as the Stresemanns (*ibid.*: 22) tentatively suggest. A pause in the molt seems to occur from February to May when the Sunbittern may breed, as do numerous other bird species of northern South America.

Secondaries.—The molt of the secondaries starts more or less simultaneously at three centers and proceeds from each of them inward in ascending order. These "centers" are represented by S1, S5, and S10. Irregularities in the molt of the secondaries appear to be common.

Rectrices.—Normally the molt of the tail feathers proceeds from the center of the tail outward, following the centrifugal mode. A few minor irregularities of this sequence have been noticed.

GUANS (CRACIDAE)

WING AND TAIL MOLT SEQUENCE OF IMMATURE BIRDS

The full variation of the sequence of molt is not well understood as juvenile birds are rare in collections. I examined 7 specimens of 5 species.

Primaries.—The primaries are molted in a normal descending sequence. The distal P8a, P9a, and P10a are replaced after P7b is complete (E. and V. Stresemann, *ibid.*: 67).

Secondaries.—As the Stresemanns (*ibid.*: 66) note, contrary to all other immature Galliformes, S5 rather than S3 represents the focus from which the molt proceeds inward and outward (see *Ortalis guttata*, ICN-5131, below).

Rectrices.—The molt of the rectrices of juvenile cracids begins with an intermediate pair and proceeds both inward and outward in each half of the tail. This peculiar sequence was first noted by Taibel (*Riv. Ital. Orn.* (II)10: 93–126, 1940; and *ibid.*, (II)23: 85–122, 1953) in *Crax*, *Penelope*, and *Ortalis* and by E. and V. Stresemann (*ibid.*: 87) in *Aburria*. A juvenile specimen of *Chamaepetes goudoti* I examined started to molt the rectrices in this same sequence (see below).

The first generation of tail feathers of the cracid chick grows in strict sequence in pairs of two (Taibel, *ibid.*). The first to break the skin are R3 and R4, then R2 and R5, followed by R1 and R6. This strict growth sequence of the first feather generation contrasts sharply with the irregular replacement of tail feathers in adult birds (E. and V. Stresemann, *ibid.*: 116). The sequence is still preserved during the first tail molt of immature birds, although the tendency to shed the tail feathers singly one after another (instead of in pairs of two) is already apparent at this stage, e.g. 3-4-2-5-1-6 or 4-3-5-2-1-6. In a juvenile *Penelope superciliaris* raised by Taibel (*ibid.*, 1953 and quoted by Stresemann, *ibid.*: 68) the molt sequence was as follows (the number of days between shedding of two feathers is indicated in parentheses): 3 (10), 4 (20), 5 (40), 2 (30), 1 (30), 6. The same tendency to shed single feathers, instead of pairs of two, is indicated by several records of molting immature *Crax rubra* and *Tetraogallus* sp. published by the Stresemanns (*ibid.*: 68, 93). A young *Crax globicera* raised by Taibel (*ibid.*, 1940 and quoted by Stresemann, *ibid.*: 67) molted the first tail feathers in pairs of two: 3b and 4b, 2b and 5b, 1b and 6b appeared on the 45th, 80th, and 150th day, respectively.

In the seven immature molting birds I have examined the partners of the three pairs of rectrices have not been replaced at the same time (see records below). In the specimen of *Chamaepetes goudoti* the two R3b are half completed, while neither the left nor the right 4a was shed. In *Penelope jacquacu*, *P. purpurascens*, and *Ortalis guttata* the left and right R3b appeared much earlier, and are appreciably longer, than R4b. In *Penelope ortoni* (ICN-5142) R3b is complete while R4b still shows traces of the sheath. In this bird R2b also appeared before R5b did so. A similar situation is found in the second specimen of *P. ortoni* (ICN-5141) in which R2a and R5a were shed simultaneously. It is interesting to note that in the latter bird the left R6a was replaced very early while R3b and R4b were growing.

The above data indicate that the molt sequence of the rectrices of im-

mature cracids represents a transitional stage between the orderly growth of the first feather generation and the irregular replacement of the rectrices in adult birds. The tail feathers of the second (b) generation usually do not appear in pairs of two but singly one after another, and certain irregularities are noted already on this stage. These irregularities become more pronounced during later molts until the adult replaces the tail feathers in no regular sequence.

Records:

Chamaepetes goudoti

Juvenile, without data, Museum Popayán, Colombia
 Bird fully feathered, only about half the size of an adult.
 Pl, r 1 lost, 2b-4b, 5b adv, 6a-10a
 Sl, r 1a-2a, 3b y, 4b-6b, 7b y, 8a-15a
 Rl, r 1a-2a, 3b adv, 4a-6a

Ortalis guttata guttata

22 February 1959, ♀, Macarena, Dep. Meta, Colombia, ICN-5131
 Bird fully feathered with some down on head and neck; about half the size of an adult.
 P1b-3b, 4b adv, 5 missing, 6a-10a
 S1a-3a, 4b y, 5b, 6b y, 7a-12a
 R1a-2a, 3b adv, 4b y, 5a-6a

Penelope ortonii

22 August 1943, ♂, Río Anchicayá, Dep. Valle, Colombia, ICN-5142
 Bird fully feathered, about half the size of an adult.
 P1b-5b, 6b adv, 7b y, 8a-10a
 S1a, 2b y, 3b-9b, 10b adv, 11b y, 12a-15a
 R1a, 2b adv, 3b-4b, 5b adv, 6a

22 August 1943, ♂, Río Anchicayá, Dep. Valle, Colombia, ICN-5141
 Nest mate of preceding bird and of similar size.
 P1b-4b, 5b y, 6b y, 7a-10a
 S1a, 2b adv, 3b-6b, 7b adv, 8b adv, 9b y, 10a-15a
 R1a, 2b y, 3b-4b, 5b y, 6b adv: left (6a: right)

Penelope jacquaçu grantii

7 February 1948, ♀, Uaipantepui, Dep. Bolivar, Venezuela, Caracas-42765
 P1b-3b, 4b adv, 5b adv, 6a-10a
 R1a-2a, 3b, 4b y, 5a-6a (1a and 6a still show traces of the sheath at the base)
 6 February 1948, ♂, Uaipantepui, Dep. Bolivar, Venezuela, Caracas-42764
 P1b-2b, 3b adv, 4b y, 5a-10a
 R1a-2a, 3b, 4b adv, 5a-6a

Penelope purpurascens aequatorialis

30 March 1951, ♀, Las Bonitas, Dep. Apure, Venezuela, Caracas-53998
 P1b-2b, 3b adv, 4b y, 5a-9a, 10a adv
 R1a-2a, 3b adv, 4b adv, 5a-6a (1a and 6a still show traces of the sheath at the base)

SUMMARY

In the Screamers (Anhimidae) the molt of the primaries starts with the innermost feather (P1) and follows a descending sequence in early stages: 1-2-3 or 1-2-3-4. This orderly growth of the primaries is not found on later stages of the wing molt when the middle and outer primaries are replaced apparently in no regular sequence. The molt sequence of the rectrices seems to be irregular in this family.

The Sunbittern (*Eurypyga helias*) molts the primaries mostly in the normal descending order. The secondaries are molted probably from three centers inward. The tail feathers are replaced centrifugally.

In immature Guans (Cracidae) the molt sequence of the tail feathers represents a transitional stage between the orderly growth of the first feather generation (when the rectrices appear in pairs of two) and the irregular replacement of the tail feathers in adult birds.

Mobil Oil Corporation, Field Research Laboratory, P. O. Box 900, Dallas, Texas 75221.