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THE DOWNY YOUNG OF *DENDRAGAPUS*

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Plate 19

ALLAN BROOKS (Auk, 29: 252-253, 1912, and 43: 281-287, 1926) and Swarth (Univ. California Publ. Zool., 24: 204, 1922, and 30: 73-85, 1926) have pointed out marked variations in the hooting apparatus, notes and shapes of tails among grouse of the genus *Dendragapus* that led the A.O.U. in the 'Check-list' of 1931 to recognize two species: *obscurus* of the Rocky Mountains, with three races and *fuliginosus* of the Pacific Coast, Cascade and Sierra Nevada Mountains, embracing four subspecies. Peters ('Check-list of Birds of the World,' 2: 28-29, 1934), however, considered all as belonging to the single species *obscurus*. Thus, notwithstanding trenchant

EXPLANATION OF PLATE 19 (opposite)

DOWNY YOUNG OF *Dendragapus*

FIG. 1.—DUSKY GROUSE, *Dendragapus obscurus obscurus* (Say). ♂, New Castle, Colorado, July 20, 1902; no. 8071 collection of Louis B. Bishop.

FIG. 2.—RICHARDSON'S GROUSE, *Dendragapus obscurus richardsoni* (Douglas). ♂, Okanagan Landing, British Columbia, June 5, 1936; no. 8288 collection of Allan Brooks.

FIG. 3.—MOUNT PINOS GROUSE, *Dendragapus fuliginosus howardi* Dickey and Van Rossem. ♂, 2 miles northeast of Mt. Pinos, 8000 feet, Kern County, California, June 11, 1929; no. 54126 Mus. Vert. Zool.; weight 22.5 grams.

FIG. 4.—SIERRA GROUSE, *Dendragapus fuliginosus sierrae* Chapman. ♂, near Martin Creek, 5700 feet, near Mineral, Tehama County, California, June 17, 1925; no. 45866 Mus. Vert. Zool.; weight 13.8 grams.

FIG. 5.—SITKA GROUSE, *Dendragapus fuliginosus sikensis* Swarth. ♀ (?), Hooniah, Chichagof Island, Alaska, June 25, 1907; no. 152 Mus. Vert. Zool.

FIG. 6.—SIERRA GROUSE, *Dendragapus fuliginosus fuliginosus* (Ridgway). Sex? (not recorded), Coyote Peak, 3000 feet, Humboldt County, California, June 11, 1933; no. 62907 Mus. Vert. Zool.; weight 16.8 grams.

All figures two-thirds natural size.



1



2



3



4



5



6

Allan Brooks.

differences in vocal apparatus and sound of adult males, consistent tail variations of both sexes and absence of known intergradation of any sort between members of the two groups, it appears still to be controversial whether one or two species of *Dendragapus* should be recognized. It now turns out that color of the downy young, considered to be rather fundamental or recessive in nature, must be added to the list of characters separating the grouse of these groups. It is not the purpose of this paper to enter this controversy, but the A.O.U.'s classification will be followed as perhaps best illustrating the relationships of the members of the genus. Nor will the question be considered here of the validity of the subspecies *flemingi*, which Swarth (Proc. California Acad. Sci., (4) 20: 1-7, 1931) claimed to be identical with *richardsoni*, since its downy young was not examined. The writer recognizes Swarth's (loc. cit.) *pallidus* as a valid form, but it appears to be restricted in range to the mountains of eastern Oregon and possibly of Washington. Recent examination of a number of adult specimens from the vicinity of Okanagan Landing, British Columbia, indicates that this grouse population is closer to *richardsoni* of the Rocky Mountains of that province than to *pallidus*. Accordingly, the specimen from Okanagan Landing here figured, is designated as *richardsoni* and the downy young of *pallidus* is not mentioned since none was seen.

Swarth (supra cit., p. 76), in comparing the natal down of '*flemingi*' (= *richardsoni* ?) from the Atlin region with similar plumages of *sitkensis* and *fuliginosus*, remarked that the former is much less yellow, more gray, than are young of the coastal birds. This observation appears to have been overlooked by Bent ('Life Histories of Gallinaceous Birds,' p. 108, 1932) who describes only the downy chick of *fuliginosus* and states that in full juvenal plumage the racial characteristics begin to show. This statement was doubtless made because insufficient specimens in neossoptile down were available, for there are but few in most museums, especially in eastern ones. Examination of a number of small chicks of six races of *Dendragapus* reveals marked differences between members of the two groups or species and in most cases sufficient variation among forms of the *fuliginosus* group to permit of their subspecific identification.

The differences in the downy young of *Dendragapus* are more satisfactorily shown in the colored plate (Plate 19) accompanying this paper than it is possible to indicate by word descriptions.

In the course of this study, material in addition to the specimens here figured was examined. My sincere thanks are due to the authorities in charge of the museums and to the owners of private collections whence specimens were borrowed, for the privilege of using same. Especial thanks are due Dr. Joseph Grinnell for making the magnificent series of downy young grouse in the Museum of Vertebrate Zoology available and for

permission to send four of them to Major Brooks as subjects for the plate. Similar thanks are due Dr. Louis B. Bishop and Major Brooks for furnishing the specimens figured of *obscurus* and *richardsoni*, respectively. I am further indebted to Major Brooks for the great pains he took in preparing the original painting which provides faithful reproductions of the young birds and for advice on matters pertaining to the preparation of this manuscript.

The study was limited to young birds still clothed entirely in natal-down contour plumage, with three exceptions noted beyond in which more or less juvenal dress has been assumed. The strictly downy chicks (eliminating the latter three specimens) vary from the very small *sierrae* figured (M.V.Z. 45866) in which the secondaries are just bursting their sheaths (entire weight 13.8 grams) to the largest (C.A.S. 29073, *fuliginosus*) which could probably just have flown. In this specimen the rectrices are 14 mm. long and the first juvenal contour feathers are just appearing on the sides of the upper breast. Unfortunately I lack information on the development of young grouse hatched and reared in captivity; but judging from downy chickens, M.V.Z. 45866 could not be more than two days old and the largest, C.A.S. 29073, less than ten days in age. The *richardsoni* figured (A. Brooks 8288) is very slightly larger than the small *sierrae* and its label indicates that remains of yolk were found in the stomach, in addition to nine black Coleoptera 5 mm. long. This would indicate that its age was about two days. Two of four young collected by me in Mendocino County, California, May 16, 1937 (J. Moffitt nos. 2049-50), weighed 18.3 and 18.4 grams, respectively. Their remiges were less than half developed and they could not fly. These birds were thought to be about four days old and represented the average development of most specimens examined. Surely few, if any, of the skins used in this study (excluding again the three juvenals) could have been much over one week old when collected. Probability of changes in coloration through plumage development and fading within this period is recognized to exist, also of fading after death, but because the extent of any such changes is unknown to me for any one brood, they are not considered here, nor are they thought sufficient to affect materially the conclusions here advanced. A total of twenty-one true downies was examined, of which seven are of the *obscurus* group and the remainder of the coastal aggregation. This material, rare in most collections, warrants detailed comment, necessary for an understanding of variation within the two groups.

In addition to the two representatives of the *obscurus* group figured, a chick from the same brood as the *richardsoni* (A. Brooks 8288), identical in every way including data, was examined in the H. B. Conover collection (no. 12075), in the Field Museum of Natural History; also the following specimen referable to *richardsoni*: Philadelphia Academy of Natural Sci-

ences 70669 (sex not recorded), Burmis, Alberta, June 16, 1926. The latter, about the same size as the Okanagan chicks, is intermediate between them and the Colorado specimen in coloration, being somewhat browner above and on the breast, flanks and thighs. It emanates from a locality known to be inhabited by typical *richardsoni*. U. S. National Museum 222615, ♀ ? juv., Moose Pass (near Yellowhead Pass), British Columbia, July 27, 1911, is in nearly complete juvenal dress but retains sufficient natal down ventrally to show that it was a pale-gray chick. Its locality is closest to the restricted type locality of *richardsoni* (Jasper House) of any specimen examined. U. S. National Museum 62219 (unsexed), Teton Canyon, Idaho, July 30, 1872, is in about half-assumed juvenal plumage, but is noteworthy because its remaining down is yellowish in color, and it is the only example of the *obscurus* group examined in which a suggestion of this color was indicated. I am not at all convinced, however, that this color is natural to the specimen for it appears more likely to be adventitious in nature. The third partly juvenal contour-plumaged bird included in this study, no. 1745 collection of Stanley G. Jewett, ♀ juv., Chelan County, Washington, August 3, 1918, retains considerable down on its head, interscapular region and ventral surface, that is gray or brownish, with practically no yellowish. Thus, this specimen which emanates from a locality thought to be inhabited by *fuliginosus* (though I have seen no adults from the vicinity), resembles the young of the *obscurus* group much more than coastal birds. Adult birds from the region should be examined critically.

Downy young of *D. o. obscurus*, additional to the specimen figured, were examined as follows:

U. S. Nat. Mus. 60221 (unsexed), Mountains of St. George, Utah, June 10 [year?].

Mus. Vert. Zool. 57321 ♂, Kingston R. S., 7500 feet, Lander County, Nevada, June 5, 1930; weight 27 grams.

Mus. Vert. Zool. 57322 ♂, same data; weight 24.5 grams.

The Utah specimen is slightly larger than the Colorado one figured and is very close to it in coloration, being rather brownish above and on the sides of the breast, flanks and thighs. The two Nevada downies, which are somewhat larger, are much less brownish in equivalent parts. They resemble closely the young of *richardsoni* figured, being blacker above and on the wings than *obscurus* and paler, more gray, less brownish on the breast, flanks and thighs. Indeed, there is little to distinguish these Nevada birds from the Okanagan Landing ones, save their slightly paler ventral surfaces. Linsdale (Amer. Midland Nat., 19: 51-52, 1938) considers these specimens referable to *pallidus* but I have examined adults in the Museum of Vertebrate Zoology from this county, which, because of their gray terminal tail bands, I can call only *obscurus*.

These chicks of the *obscurus* group indicate that the natal plumages of specimens from Colorado and Utah are more brownish than those from more arid, less-forested, semi-desert western localities including central Nevada and the Okanagan district where blacker-backed, ventrally paler-colored chicks are produced. The Burmis, Alberta, specimen is, as would be expected from its environment, closer to the Rocky Mountain young, but intermediate to the Okanagan specimens. It is noteworthy that this Alberta chick exhibits no marked darkening dorsally, as might have been expected from its dark-colored adults. Thus, variation in the limited number of young of the *obscurus* group available for this study, from a tremendous area suggests that climate and environment may play a stronger part in their differences than characters inherited from their parents.

Now, to consider the fourteen examples of the *fuliginosus* group studied, ten specimens of this species that were available, in addition to the four figured, bear the following data:

Mus. Vert. Zool. 15577-8 (not sexed), Alberni Valley, Vancouver Island, British Columbia, June 18, 1910.

A. Walker 9280 ♂, 9282 ♀, Tillamook, Oregon, June 5, 1933.

Calif. Acad. Sci. 29073 ♀, ten miles northwest of Forest Glen, 3100 feet, Trinity County, California, June 18, 1936.

Calif. Acad. Sci. 44365 ♀, Seaview, Sonoma County, California, May 12, 1908.

Mus. Vert. Zool. 19128 ♂, north fork of Coffee Creek, 4500 feet, Trinity County, California, July 8, 1911.

J. Moffitt 2047 ♂, 2048 ♀, five miles northwest of Yorkville, 1950 feet, Mendocino County, California, May 16, 1937.

Calif. Acad. Sci. 34873 sex?, near Mt. Whitney, California, "summer," 1904.

Only the specimen figured was available of the race *sitkensis*, but another of smaller size, similar to it in extreme reddish coloration, from the Queen Charlotte Islands, British Columbia, has been examined in the Conover collection. On the basis of adults examined from nearby localities, the specimens listed above, with exception of the last which is *howardi*, are considered closest to *fuliginosus*. But there is a wide range of variation in colors of these downies, as also in adults, from over this area.

Downies examined from the humid coast are extremely reddish in coloration. The Vancouver Island specimens are almost as red as the *sitkensis* figured, being perhaps a trifle blacker dorsally. The Tillamook specimens are equally reddish, but their ventral yellow is paler than in the preceding three specimens, being the shade of that in the *fuliginosus* figured. It is regretted that no downy of the latter race from near the type locality (Mt. Hood, Oregon), could be located for this study, but such inland specimens are probably paler than north-coastal birds, more like the one figured from Humboldt County, California. The California Academy of Sciences'

specimens from Trinity and Sonoma Counties, California, although of larger size than the *fuliginosus* figured, are very similar to it in coloration. No. 19128 Museum of Vertebrate Zoology, also a large downy, emanates from a region where intergradation between the coastal form and *sierrae* is known to occur. This is indicated by the specimen's pale ventral coloration, but it is more reddish dorsally than the other California downies thus far discussed. The two Mendocino County birds lean still more toward *sierrae*, being pale yellow below, yet brighter than *sierrae*, and they lack much of the dorsal redness of the other coastal specimens. These two chicks of a brood of four collected are interesting in showing that individual variation exists in the downy young of a clutch. No. 2047 is paler than the other and its remiges are more developed; its rump stripes are brown, while in the other they are black. The intermediate nature of these chicks' plumages between those of *fuliginosus* and *sierrae* was to be expected, for adults from the locality are likewise intermediate with individual variation completely bridging the gap between the two races.

The chick of *sierrae* figured is the only representative of that race available for study. Its similarity to the young of *howardi* is apparent, but the former is less reddish, more blackish, dorsally and slightly brighter yellow ventrally. California Academy of Sciences 34873, *howardi*, is of the same size as the one figured and closely matches it in coloration, though perhaps a trifle darker dorsally and brighter yellow ventrally, thus being intermediate between the *sierrae* and *howardi* of the plate.

As regards the *fuliginosus* group, the study indicates that young from the humid coast north of California are very reddish in color. There is little difference between those of *sitkensis* and of *fuliginosus* from Vancouver Island, while downies from coastal Oregon are similarly reddish, but paler yellow. Young from coastal California are still paler in color with redness especially reduced. This is more noticeable in specimens from inland localities where it probably represents a trend toward, or intergradation with, *sierrae*. The young of the last race and of *howardi* are extremely pale in coloration as compared with other representatives of the species and are quite similar; the former is slightly darker than the latter. Thus in the *fuliginosus* group, as in the *obscurus* aggregation, it is seen that young from areas of higher humidity and denser plant growth are much browner or reddish and brighter in pigmentation. Yet even in the pale *howardi* of the southern Sierra Nevada, yellow is characteristic of the ventral tone, while this color is found lacking in representatives of the *obscurus* group.

SUMMARY

Examination of twenty-one downy specimens of the genus *Dendragapus* indicates that those of the *obscurus* group are essentially grayish birds

ventrally, a consistent difference from the yellowish chicks of the *fuliginosus* group. Further, that in both groups, browns and reds predominate in specimens from humid or heavily forested regions as compared with those from more arid localities, which are paler in general coloration, especially ventrally. Variation exists in the downy young of most races examined to an extent comparable to that present in adult plumages and sufficient to provide satisfactory subspecific identifications.

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