

COLORS INDUCED IN MALE HOUSE FINCHES BY REPEATED FEATHER REMOVALS

By HAROLD MICHENER and JOSEPHINE R. MICHENER


In a study of the color of male House Finches (*Carpodacus mexicanus frontalis*) two years ago (Condor, xxxiii, 1931, pp. 12-19) we endeavored to follow the color changes of birds during single and successive years. In order to do this we kept samples of the rump feathers as records of their color, and as the bird returned three months or more later we took another sample. We made no attempts to take the succeeding feather samples from feathers replacing those previously plucked, for our object was to follow the change that occurred normally from molt to molt, for as many years as the bird visited our traps. We suspected that plucked red feathers might be replaced by brown or yellow, but we knew that in many birds, caught for the first time, there was a sprinkling of brown or yellow feathers with the red and that some, just molted, showed a mixture of red and yellow; so we did not feel the presence of some brown or yellow feathers any proof that the plucked red were replaced by feathers of another color.

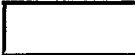
However, we decided to keep records of this point and now we present the results of this work. We have used for this purpose a few birds that were good repeaters. We removed all the feathers from the red area of the rump unless the rump patch was so large that skin would be left uncovered, in which case the posterior feathers were removed. The feathers growing from these same follicles were again removed the first time the bird came back to us after they had grown sufficiently to show their color. There has been no doubt that we have been able to follow the successive growths of these feathers. The removal of the rump feathers, which are very loosely attached, has not caused the slightest discomfort to the birds, in so far as we have been able to observe. No shock is manifested in any way when the feathers are plucked.

The feathers were mounted in the order of their removal for study and were matched with the colors in Ridgway's "Color Standards and Color Nomenclature", 1912. Since it is not easy to match the small tips of these feathers with the colors shown in Ridgway, it is probable that another worker would have chosen slightly different colors to match our feathers, but we feel that the colors we have chosen show the changes that occurred.


















Banded male House Finch B87093 appeared in our note book in this connection on May 26, 1930. Our notes describe him as rather light red and the red areas as rather limited in extent. He had a few yellow feathers over the right eye and we thought this yellow area larger than when he had been caught a short time before. The red feathers in this region seemed in poor condition: it seemed possible the red ones were dropping out and being replaced by yellow. We removed all the red rump feathers which were Carrot Red. A month later on June 24 we caught him again. The plucked red were replaced by Old Gold and there was considerably more yellow on the head and some on the chest. These new rump feathers were removed. On August 2 he was found to be molting and the very few rump feathers that showed color were removed because they were a soft pink, Flesh Color, and it was of extreme interest to us that the yellow which had replaced the red was now, at the molting season, being replaced by red. By August 25 our next record shows the rump a decided red, Testaceous, and on this date all the red feathers were removed. Two weeks later, on September 7, the rump feathers were again grown out. They still showed a good deal of red but were yellower, Orange-Cinnamon, and these were also

Color names from Ridgway's Color Standards and Color Nomenclature, 1912.
 Show Card Colors are good to make Colored Cards to paste in rectangles.
 Black, White, Yellow and Red are needed.





May 26, 1930

 Carrot Red

June 24, 1930

 Old Gold




B87093

Aug. 2, 1930  Flesh Color	Aug. 25, 1930  Testaceous	Sept. 7, 1930  Orange Cinnamon	Sept. 29, 1930  Cinnamon-Buff	Oct. 16, 1930  Old Gold	Nov. 13, 1930  Isabella Color	Dec. 18, 1930  Grayish Olive	Jan. 26, 1930  Grayish Olive	March 16, 1931  Deep Grayish Olive
Aug. 29, 1931  Flesh Color	Sept. 14, 1931  Testaceous	Oct. 6, 1931  Cinnamon	Oct. 18, 1931  Cinnamon	Nov. 14, 1931  Chamois	Dec. 28, 1931  Isabella Color	Jan. 21, 1932  Light Brownish Olive	March 9, 1932  Brownish Olive	



C8879

Nov. 20, 1930  Madder Brown	Feb. 19, 1931  Olive Lake	Oct. 18, 1931  Madder Brown	Nov. 29, 1931  Olive Lake
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B78

June 13, 1930  Nopal Red	Aug. 3, 1930  Sulphine Yellow	Aug. 24, 1930  Kaiser Brown
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B54451

Nov. 18, 1930  Pecan Brown	Jan. 12, 1931  Deep Olive
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B8171

April 14, 1930  Terra Cotta	Oct. 25, 1930  Terra Cotta	Dec. 7, 1930  Buckthorn Brown	Jan. 3, 1931  Buckthorn Brown
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C2701

Oct. 12, 1930  Brick Red	Feb. 14, 1931  Old Gold	April 19, 1931  Brownish Olive
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B54401

Nov. 13, 1930  Walnut Brown	Dec. 3, 1930  Olive Citrine
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B25944

Nov. 19, 1930  Brick Red	Dec. 17, 1930  Brownish Olive	Jan. 14, 1931  Brownish Olive	Feb. 19, 1931  Brownish Olive
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B25367

Oct. 25, 1930  Brick Red	Dec. 7, 1930  Isabella Color	Jan. 26, 1931  Brownish Olive
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removed. On September 29, three weeks later, the feathers had grown out and were Cinnamon-Buff. October 16 is our next entry and this plucking is decidedly yellow, Old Gold. Almost a month later, November 13, these had been replaced by a very dull yellow and matched with Ridgway's Isabella Color and were again removed. On December 18 the feathers replacing these were almost brown but with a trace of yellow, Grayish Olive. Over a month elapsed before the bird was again caught, on January 26, 1931. The feathers were again grown in and were Grayish Olive. On March 16, after an interval of seven weeks, the rump feathers had grown but were very short and were brown with almost no trace of yellow as we think of it in bird plumages. These feathers were plucked and matched with Ridgway's Deep Grayish Olive.

On April 8 the same House Finch was again trapped. He had grown no new feathers on the plucked area which had now been bare since March 16, an interval of over three weeks. A Jay on top of the trap, at this time, picked the red feathers from the top of his head till it was quite bare. For some reason his right side, both breast and flank, had lost the feathers. New ones growing in were about three-eighths of an inch long and still in the sheath. We released him hoping he would not fail to return. On April 20, twelve days later, he was again in our hands. New head feathers were starting in place of those plucked by the Jay. The new feathers on the breast and flank were not yet sufficiently developed to show the color. Five days later, April 25, the top of his head was well feathered. It was brown. On April 30 the feathers of his flank and breast had grown out and were brown mixed with yellow. The left side was the original red. The rump was still bare. Records of May 2, May 13, July 4 and August 12 were all marked by such notes as "Rump feathers not replaced", "No new feathers starting". It was thus now almost five months since the short brown rump feathers were removed, on March 16. They were not replaced, although feathers removed August 25, soon after the previous molt, were grown out by September 7, thus within a period of two weeks.

On August 29 our bird was captured and new feathers were then growing in everywhere. The rump feathers that were starting were again Flesh Color, but only two or three were long enough to show this and only these were removed as evidence in case he failed to return. But on September 14 he was again trapped and the colored areas were all of the soft red of this time of the year and matching exactly his red of the preceding year, Testaceous. The rump feathers were removed. Those plucked on October 6 and on October 18 were Cinnamon, on November 14 a decided yellow, Chamois, on December 28, Isabella Color, on January 21, 1932, Light Brownish Olive, and on March 9, Brownish Olive.

A comparative summary of the color changes in the three molt years is worth while. In the first year the first plucking, which was on May 26, caused the abrupt change from Carrot Red to Old Gold. On the two succeeding years a very few of the first rump feathers to show color after the molt began were plucked. In both cases they were Flesh Color and in neither case did this plucking affect the color of the rump which was Testaceous at its first complete plucking 23 and 16 days later, respectively. The colors of the rump feathers at each successive plucking are as follows, those for the third year being named last in each case: first, Testaceous both years; second, Orange Cinnamon and Cinnamon; third, Cinnamon-Buff and Cinnamon; fourth, Old Gold and Chamois; fifth, Isabella Color both years; sixth, Grayish Olive and Light Brownish Olive; seventh, Grayish Olive and Brownish Olive; eighth, Deep Grayish Olive with no replacement until the molt, and there is no corresponding sample for the third year.

Another point that should be noted is that on the second year the first rump feathers to show color after the molt had begun were plucked on August 2 while on the third year these were not available until August 29. Did the eight pluckings of the second year make these feathers twenty-seven days later in starting to grow the third year?

Other birds have been treated in the same way. No other one has returned so consistently, but all have shown the same decided change in the color of the rump feathers although in all the others the change has been more abrupt. None, however, was plucked immediately following the molt and at very short intervals thereafter, as was done with the first bird described. It may be they would have shown a more gradual change could this have been done.

The following is a record of the changes that took place:

C8879: November 20, 1930, Madder Brown; February 19, 1931, Olive Lake; October 18, 1931, Madder Brown; November 29, 1931, Olive Lake.

B78: June 13, 1930, Nopal Red; August 3, 1930, Sulphine Yellow; August 24, 1930, Kaiser Brown.

B54451: November 18, 1930, Pecan Brown; January 12, 1931, Deep Olive.

B8171: April 14, 1930, Terra Cotta; October 25, 1930, Terra Cotta; December 7, 1930, Buckthorn Brown; January 3, 1931, Buckthorn Brown.

C2701: October 12, 1930, Brick Red; February 14, 1931, Old Gold; April 19, 1931, Brownish Olive.

B54401: November 13, 1930, Walnut Brown; December 3, 1930, Olive Citrine.

B25944: November 19, 1930, Brick Red; December 17, 1930, Brownish Olive; January 14, 1931, Brownish Olive; February 19, 1931, Brownish Olive.

B25367: October 25, 1930, Brick Red; December 7, 1930, Isabella Color; January 26, 1931, Brownish Olive.

The first, second and fourth of this list show the return to the original color after the molt. In the case of the second, B78, the difference between Nopal Red on June 13 and Kaiser Brown on August 24 is undoubtedly due only to the absence of the barbules which have worn away leaving only the barbs in this portion of the June plumage.

The ages of all these birds are known, except one (B25944 which was an adult male when banded), since they were banded from May to September of their first year. Their ages at the time of plucking the first rump feathers were as follows:

B87093	one year,
C2701 and C8879	one and one-half years,
B25367, B54401 and B54451	two and one-half years,
B78 and B8171	three years,
B25944	two and one-half years plus an unknown number of whole years.

Apparently there is no relation between the ages of these birds and the color changes that took place due to feather plucking.

The accompanying chart is offered as a picture of the changes described. For those who are sufficiently interested to make color cards to match the colors chosen from Ridgway and paste them in the corresponding rectangles on the chart, the impression of the striking changes that took place in these rump feathers will be clear.

Pasadena, California, April 20, 1932.