

THREE BROODS OF RED-BACKED JUNCOS IN ONE SEASON

By LYNDON L. HARGRAVE

Since 1931 intensive bird banding has been conducted by the Museum of Northern Arizona at the museum laboratory on the estate of Dr. Harold S. Colton. The mass of data now available contains considerable information on the Red-backed Junco (*Junco caniceps dorsalis*). All observations here recorded were made in the immediate vicinity of the laboratory, where both feeding and banding stations were maintained more or less regularly.

Summer activities of the Red-backed Junco were first noted on March 26, 1935, when two juncos were trapped under conditions that strongly suggested that they were mates. One of these birds wore an old band, number H57672; the other was unbanded. The new bird was given band number H57699. Number "72" was banded at the laboratory on January 30, 1935. It was next trapped at the same station on March 8, but there is no reason to believe that it was not in the vicinity during the interval; the station was not operated regularly. The station was attended more regularly for a while after March 8, and number "72" was taken on the 12th and 13th.

While these birds were at the station on March 26, the banded bird, number "72", was seen to enter a two-compartment trap. The unbanded bird approached the trap, "quivered" before the trapped bird, then entered the empty compartment. The actions of the new bird, number "99", indicated that the bird was a female. The probability that number "72" was a male was verified when it was released, since it flew to a near-by tree and sang. When released, "99" did not sing. In the late afternoon of the 26th, these two juncos were again caught together in the same trap and on release "72" again sang, while "99" did not. Number "72" was recaptured again on April 2 and 3 when it sang when released. Number "99" was recaptured on March 28, and twice on April 4 but it never sang when released. No other juncos were seen during this period. Observations on these two juncos are considered to be conclusive in determining the sex of each individual, "72" a male, "99" a female.

Little is known about "99" prior to her date of banding. She probably was in the vicinity of the station for a few days before March 26 since two juncos were observed on March 24 when one was carrying nesting material. It was not determined whether either of them was banded. It is probable from the foregoing data that the male, "72", a possible winter resident or at least an early spring migrant, was on his breeding ground before the arrival of his mate, "99".

Red-backed Juncos have been known to nest within 100 yards of the banding station, although individuals of this race are not common in the vicinity of the station during the breeding season. During the summer of 1934 a pair of red-backs successfully hatched a brood in a nest in vines under the eaves of the house. Although I was away practically all summer, on several occasions I had an opportunity to observe a Red-backed Junco on the nest. I did not determine whether either of the birds was banded. Only this nest, abnormally situated, has been found here, although in years past, young and adult red-backs have been seen in the vicinity in summer.

First Brood.—Mention of the 1934 nest and brood is made because on June 4, 1935, two banded red-backs brought a juvenile, just out of the nest, to the banding station. Search failed to reveal a new nest in the vines under the eaves of the main house, although these three birds came from the direction of the 1934 nest. The young bird barely could fly and was caught by hand and banded, number H57700.

Using number "700" as bait, number "72" was caught while feeding it. Neither of the old birds seemed concerned about the young junco being in the trap, and both adults would leave it there while hunting food, frequently returning to feed it behind the bars. Number "700" was confined in the trap until its mother was caught. As suspected, she wore band "99", thus establishing previous observations and identifying "72" and "99" as parents of "700". No other juvenal juncos were found, nor was "700" recaptured.

Second Brood.—I was unable to continue observations on these juncos during the remainder of June or in July. On July 26 Dr. Colton saw young juncos fly over the wall into the patio where the 1935 nest was located. Being familiar with my observations in March and in April, Dr. Colton set traps and caught three juvenal red-backs. They were given bands numbered H57701, H57702, and H57703. Using one of these juveniles as bait, he trapped "72", thus establishing this bird as the male parent, and also proving that the Red-backed Junco, under favorable conditions, will raise two broods in one season in the same locality. Numbers "702" and "703" repeated on August 3, but since this date none of the second brood has been recaptured. Since the mother of the second brood was not identified, it is not known if the male red-back had the same mate for both broods.

Third Brood.—After my return to the station in early August no time was devoted to banding until the 21st. On the 20th I heard young juncos near the feeding station and on the 21st I saw two banded adults and one juvenile. The young bird barely could fly and was caught by hand and banded, number H57704. Later in the same day I again saw the banded adults and flushed three juveniles. The juveniles could not be caught by hand, but on the 22nd one, H57705, was caught with "72", thus establishing him as the father of three broods in one season in the same locality.

Further proof that "72" was the father of the August brood is shown by a joint capture of "72" and "704" on September 3. Another juvenile and a banded adult were at the feeding station at the time number "704" was recaptured. Number "72" was in the middle of the annual molt. During the last of August the family frequently visited the station for a few minutes each day. On one occasion both adults were observed carrying millet seed to young fifteen feet above the ground in a pine tree. Number "705" repeated on September 2 with a banded adult, believed not to be "72" because it was wary, and an unbanded juvenile. At all times "99" was wary and reluctant to enter the trap. An unbanded juvenile, believed to be the one just mentioned, also was captured with "99" on September 2. It was given band number H57706.

The family was noted at the feeding station on September 4, when one juvenile and one adult were wary and remained near a small pine about twenty feet from the trap. Although none was recaptured, the birds mixed and travelled together leaving little doubt that all were of one family. Later in the day an unbanded juvenile, believed to be the last of the third brood, was taken and was given band number H57707. Although not taken with any young of the third brood with which "72" was taken, the presence of "99" with juveniles travelling with "72" is good reason to believe that "72" and "99" were mates during the third nesting period and that very likely they were mates during the entire breeding period.

Joint recaptures of these young birds further strengthen the belief that all were of one family. At no time between June 4 and September 10 were unbanded adults seen, nor were either juveniles or immatures seen in a stage of molt exceeding that of the banded members of the third brood. On September 10, "705" repeated, and there were several others present. On this date an unbanded adult and an immature

in an advanced stage of molt were seen also. This was the first unbanded adult seen since spring and the occasion is the first evidence noted of an encroachment of territory. Both unbanded birds were captured and were given numbers H57708 and H57709, respectively. On the 11th other unbanded Red-backed Juncos were noted, indicating that the fall movement was under way.

The family remained together for several days longer and at one time or another several of its members were caught together. The parents may have left the brood at the same time, since "99" was last taken on September 3 while "72" was last captured with his family on the same date. Number "72", however, was again captured on November 8, 1935, after an absence of more than two months, during which time nine trapping stations were maintained regularly and trapping was more intensive than at any time previous. The area studied covered nearly 400 acres. Had "72" been in the vicinity he almost certainly would have been captured, since he never had shown fear of the traps. Number "704" repeated regularly until the 16th; "705" until the 15th; "706", while in the trap on the 14th, was killed by a Sharp-shinned Hawk, and "707" was last trapped on the 17th. When the brood moved out, migrating Red-backed Juncos were abundant.

Summary.—The summer's observations on breeding Red-backed Juncos at Coyote Range, Flagstaff, Arizona, have shown (1) that the male probably wintered within his prospective summer territory inasmuch as he returned to the locality on November 8, 1935, where he was banded on January 30 of the same year and where he was recaptured in early March; (2) that the female probably appeared on her breeding ground after the male had established himself; (3) that nesting activities were under way by March 24; (4) that one brood was hatched near the first of June, another in late July, and the last in late August; (5) that the male was father to three broods and the female was mother to the first and third and probably the second broods; (6) that shortly after leaving the nest the young of all but the last brood moved out of the nesting territory; (7) that the third and last brood remained within the nesting territory until the postjuvenile molt was nearly completed; (8) that the parents apparently left the nesting territory together and ahead of their offspring of their third brood; (9) that, after the summer adults had left, the young of the third brood remained and mixed with others of their race; and (10) that the members of the third brood apparently left the nesting territory together after the fall migration was well under way.

Museum of Northern Arizona, Flagstaff, Arizona, January 1, 1936.