PAIRING AND COURTSHIP IN THE NORTH AMERICAN DIPPER

By Pamela J. Morse

Several authors have covered aspects of the behavior of the North American Dipper (*Cinclus mexicanus*) including territorial, feeding, and nesting behavior. Bakus (1959a) relates a few observations on pairing, courtship, and mating, and other studies (Sunquist, 1974; Price and Bock, 1973) mention pairing and courtship, but do not discuss them in detail. As part of a behavioral study beginning in the spring of 1976 and continuing through the spring of 1978, I obtained some new information regarding these aspects of the Dipper.

THE STUDY AREA

The study area was located on Big Creek, in Township 11 South, Range 25 East, in eastern Fresno County, California, and extended from its outlet into Pine Flat Lake, elevation approximately 250 m, to a bridge 13 km upstream at an elevation of 500 m. The stream had stretches of fast water flowing over and around large boulders interspersed with deep, quiet pools. *Populus Fremontii, Alnus rhombifolia,* and *Salix* sp. were the dominant forms of macrovegetation along the stream edge.

Most observations were made at a small dam crossing Big Creek, about 8.5 km above Pine Flat Lake, at an elevation of 400 m. The overflow from the dam formed two small waterfalls, then cascaded down a large granite rock, where it flowed into a deep pool before continuing down the stream.

METHODS

Six dippers were captured between 18 November 1976 and 17 April 1977 in mist nets stretched across the stream. All birds were adults and each was individually color banded with plastic and aluminum bands. A letter corresponding to each set of color bands was designated for each bird. Sex was later determined by nesting activities.

RESULTS OF OBSERVATIONS

A pair of Dippers was observed on 26 February at the small dam and these were captured and banded on 5 March. They are referred to as Male B and Female X. The two birds appeared to maintain a pair bond for about three weeks. Female X was seen searching for nesting material, pulling at long grass on the stream banks, and Male B was once seen carrying nesting material.

Courtship occurred soon after the Dippers had paired and nest building went on during this period. On 10 March at 1100, a courtship display between Male B and Female X was observed. Each bird displayed singly at different times. Features of the display were as follows: the neck was stretched upward and the bill held vertically; the wings were stretched down and slightly open, the breast was pushed forward with

the feathers pressed tightly against the body. In this manner, the bird strutted in front of its mate for 20 to 30 sec while loudly singing. This behavior is similar to the upright posturing of the European Dipper (*Cinclus cinclus*) as described by Hewson (1967).

At 1146, I observed both birds display simultaneously. An unbanded Dipper entered the territory and both members of the pair joined in chasing the intruder out. Afterwards the two banded birds returned to the dam and displayed to each other in the manner described above. The display ended by the birds facing each other, jumping into the air about 30 cm, and touching their breasts together.

On 13 March at 1030, an unbanded Dipper again entered the territory and was tolerated by Male B. Shortly after its arrival, Female X appeared and chased the intruder away. Only then did Male B join in the pursuit.

Four days later, on 17 March, Male B was again seen with an unbanded Dipper and Female X was not present. Agonistic behavior between the pair and unmarked birds had been previously observed but since Dippers tend to remain in the same territory for a length of time (Hann, 1950; Bakus, 1959b), I assumed that this unbanded bird was the same one I saw on 13 March. The new Dipper was captured and banded. Male B had repaired; his former mate was found about 300 m downstream on the same day.

On 24 March, Male B was seen displaying to the new Dipper which had begun nest-building, thus confirming the suspicion that it was a female. She is referred to as Female Y. Male B attempted to mate with her twice that day.

Three days later, Female X was present in the small dam area and after some chasing, no further interaction occurred between the two females. On that day, all three birds were seen flying closely together at high speed and all three sang loudly during these flights. They circled above the trees on the stream's edge to a height of 12 to 15 m, and often as far as 10 m away from the stream bed. These pursuits were three to five min long and occurred eight times within 1 hr. I could not always distinguish which bird was chasing and which was being chased but four of the flights involved all three Dippers and four involved only two. Between flights the birds rested or fed; displays described earlier were performed when all three birds were together. The first display was performed by Female X toward Male B. He then flew to her and copulated with her on the rock upon which she was standing. He mounted her from above for about 30 sec and both fluttered their wings. During this activity, Female Y stood about 45 cm away.

Two mountings with Female Y occurred in a period of 20 min and no display preceded either of these. These mountings occurred in the water with the female completely submerged and the male straddling her body and fluttering his wings.

When the copulations were over, the two females became extremely aggressive and chased each other up and down the stream. During this

time the male perched on top of the dam and sang loudly. Fighting between the females occurred twice, with the two birds grabbing each other with their beaks and clawing at each other with their feet until they fell over the dam and were washed down past the boulders. After two hours of aggressive behavior between the females, Female X flew downstream and did not return. She remained there for the remainder of my observations and Male B was seen feeding near her.

This display flight behavior is similar to that of the European Dipper, described by Moody (1955) and to the behavior described by Sunquist (1974) of the Brown Dipper, *Cinclus pallassii.* In both *C. cinclus* and *C. pallassii* prolonged chases occurred beyond the river's course. In the Brown Dipper, these pursuits were interrupted by brief periods on the ground or on a large rock where the birds appeared to threaten each other.

Bakus (1959b) also reported a similar episode in *Cinclus mexicanus* which included chasing during the courtship at the time of mating. In his study only two birds were involved, but in this study three were observed and polygynous mating occurred. Copulation occurred on the boulders or in the water but was not observed in the air as Bakus suggested.

DISCUSSION

These observations indicate that temporary pairing, lasting about three weeks, occurs in Dippers and that they then may change mates during the pairing period. This is supported by Bakus (1959b) who also observed a repairing in Dippers after three weeks. The selection of a different mate may lead to a polygynous relationship.

Orians (1969) gives several possible reasons for the presence of polygyny in some altricial birds. He suggests that polygyny should be more prevalent among species in which feeding areas are widespread but nesting sites are restricted. If nest sites are restricted and the quality of a male's territory is suitable for more than one nest, even though he may already be paired with a female, it would be to the advantage of a second female to choose him with his prime territory rather than an unmated male in a poorer habitat. Dippers' nest sites are extremely limited (Hann, 1950; Bakus, 1959b; Price and Bock, 1973) and their feeding territories are quite large, averaging about one km of stream length.

Emlen and Oring (1977) suggest that passerine species showing unequal parental investment by the female and male are enabled to become opportunistically or facultatively polygynous because of the decreased male involvement in parental care. The behavior of Dippers is a good example of unequal parental investment because the female alone incubates the eggs, whereas both the male and female feed the nestlings. This behavior, combined with the fact that the nesting resources are highly limited and localized in space, supports the evidence for polygyny in Dippers.

Stronger evidence for polygyny would require observation of a male copulating and maintaining a pair bond with more than one female. Price and Bock (1973) considered a male Dipper to be polygynous because no other adult males were in the nest area during egg-laying, and it (1) defended a territory that included both females' territories and (2) fed both broods. There were no observations of a single male copulating with two females in their study.

In this study, a male was seen copulating with two females and that male was observed feeding in both females' territories. These observations indicate that the Dippers observed were polygynous.

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Department of Biology, California State University, Fresno, CA 93740. Received 7 July 1978, accepted 29 September 1978.