Sexual differences in the tail barring of Spotted Owls

Cameron W. Barrows, Peter H. Bloom, and Charles T. Collins

The degree of sexual size dimorphism in the Spotted Owl, *Strix occidentalis*, is less than in other medium to large North American owls (Earhart and Johnson, *Condor* 72:251-264, 1970). The range of size overlap between male and female Spotted Owls leaves body size alone inconclusive in determining the sex of individual birds. Sexual differences in plumage coloration are at best subtle. As in many owl species, males tend to have lighter facial markings and more white around the gular region than females. Although these differences are obvious in some pairs, members of other pairs do not show obvious coloration differences, even when sitting side by side.

Another clue to the sexual identity of individual Spotted Owls involves the pitch of their vocalizations. As in most owl species, the male's voice is noticeably lower. The utility of this character requires the cooperation of the owls; during daylight Spotted Owls rarely vocalize.

All of the above methods are difficult to quantify and have large areas of overlap, often making positive determination of sex impossible. Here we present a new method for determining the sex of Spotted Owls based on barring patterns on the owls' central tail feathers. To our knowledge this is the first time tail characteristics have been used as a criterion for sex determination in owls. Using differences in the barring of underwing coverts, Weller (*Bird-Banding* 36:102-112, 1965) could successfully determine the sex of Great Horned Owls (*Bubo virgianus*) about 80% of the time. Forsman (*Auk* 98:735-742, 1981) used presence of a pure white terminal bar on Spotted Owl tails as a clue to the age of individual birds.

Observations of Spotted Owls were made in southern California at Palomar Mountain and Cuyamaca Rancho State Parks, San Diego County, and in northern California at the Nature Conservancy's Northern California Coast Range Preserve, Mendocino County. Museum specimens were examined at the Museum of Vertebrate Zoology, University of California, Berkeley, Los Angeles County Museum of Natural History, Western Foundation of Vertebrate Zoology, Los Angeles, California and the American Museum of Natural History, New York, New York.

Our method of sex determination involves counting the number of bars which extend completely from the rachis to the vane margin. A bar is considered complete whether or not it extends on both sides of the rachis. Bars which do not reach from the rachis to the vane margin, at least on one side, are considered incomplete and are not counted. Differences do occur between the subspecies of Spotted Owls, *S.o. occidentalis* and *S.o. caurina;* these subspecies are considered separately in this paper. A third subspecies, *S.o. lucida,* was not evaluated. No clear differences could be found between adult and immature age classes and so they are grouped together.

Seventeen males and 21 females of the northern subspecies *(S.o. caurina)* were examined. All but one of the male birds had three complete bars; the exception had four complete bars. All of the females had four to six complete bars except one bird which had three complete bars.

In the California subspecies *(S.o. occidentalis)* 14 males and 20 females were evaluated. All of the males had two to four complete bars, whereas all but four females had five or more complete bars.

Apparently for the northern subspecies of the Spotted Owl, three or fewer complete bars indicate a male, whereas four or more complete bars indicate a female (Figure 1A). For the California subspecies, four or fewer complete bars usually indicate a male and five or more complete bars indicate a female (Figure 1B).

While our sample size is not large, this characteristic for determining the sex of Spotted Owls appears fairly reliable. Of 38 *S.o. caurina,* 94% fit the described pattern; of 34 *S.o. occidentalis,* at least 88% fit the pattern. The difference in tail barring between females and males of both subspecies is highly significant ($p<.001$, Mann-Whitney U-test). In all of the 11 live owls examined, the differences in tail barring fit the described pattern and corresponded with other sexual clues (ie. voice, body size, and behavior). In three instances, we captured both members of a mated pair and were able to make direct comparisons of their body size, facial markings, and tail barring. Several of the museum skins

that did not fit our sexing pattern were possibly misidentified; the labeled sex of these individuals did not match our subjective evaluation of their sex based on body size and facial markings. More field testing of this method, particularly with S.o. *occidentalis*, is needed to clarify its accuracy.

Spotted Owls are noted for being easily approachable, so that the barring pattern on a wild bird can be read with binoculars. A further potential use of tail barring patterns may be for individual identification. Each tail we have examined is unique and so provides a signature for the owl. We do not, however, have data on whether or not the same pattern is retained through molts.

The applicability of this method on other owl species has yet to be tested. Preliminary evaluations of museum specimens of the Barred Owl *(Strix varia)* suggest that this pattern may be a potential means of sex determination. We encourage owl banders to note the potential patterns in other owl species.

Barrows: 42101 Wilderness Rd., Branscomb, CA 95417.

Bloom: National Audubon Society, 87 N. Chestnut, Ventura, CA 93001.

Collins: Dept. of Biology, Long Beach State Univ., Long Beach, CA 90840

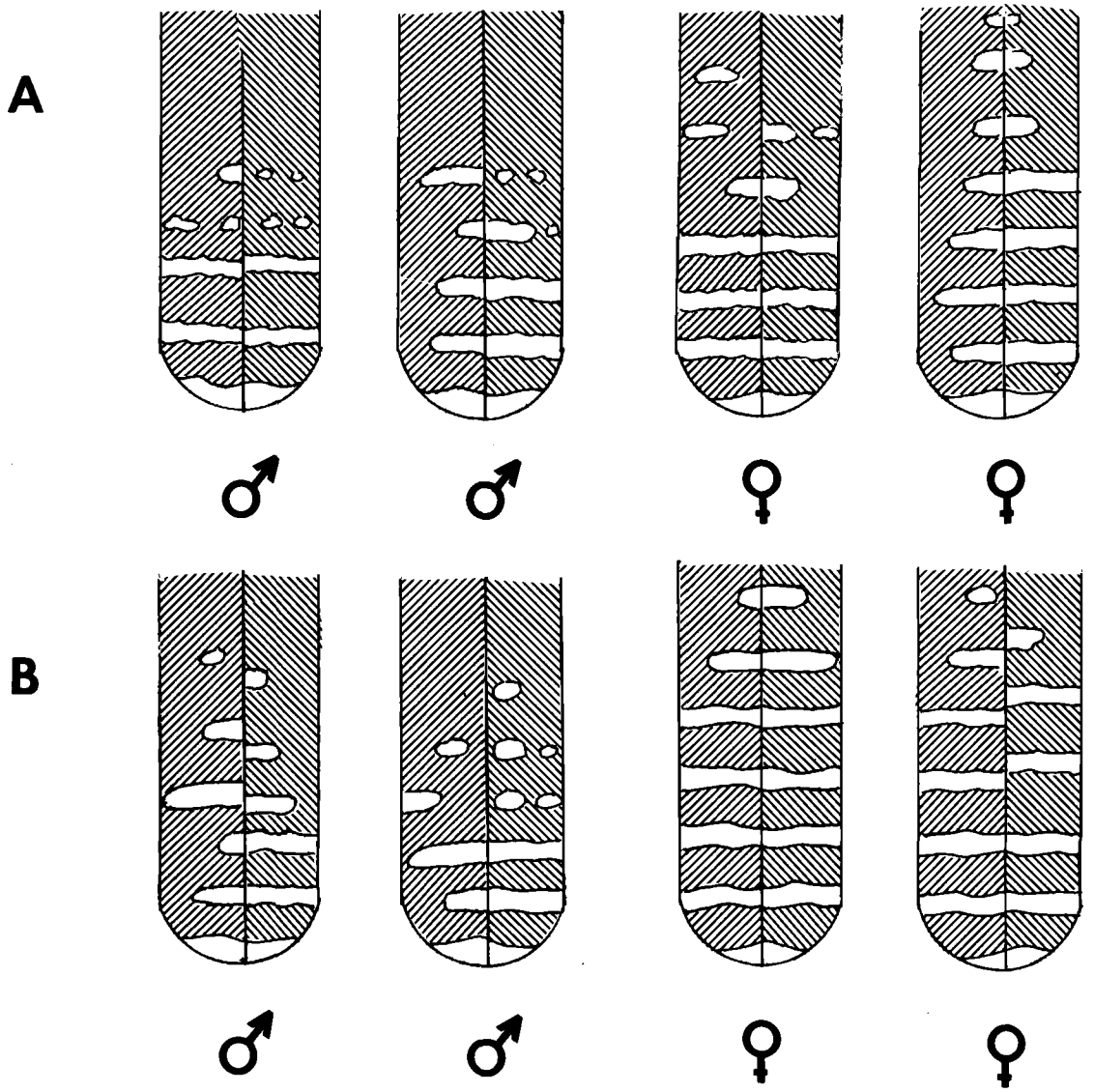

Figure 1. Selected examples of barring patterns on the central tail feathers of Spotted Owls. The northern subspecies, Strix occidentalis caurina, *is represented in A; the California subspecies,* S.o. occidentalis, *is represented in B.*