Determining the Sex of Black-billed Magpies by External Measurements.—In studies of free-living populations, meaningful inferences often can be derived only when researchers recognize sex and age classes. Erpino (Condor 70:91–92, 1968) presented criteria to age Black-billed Magpies (*Pica pica*) as adults or first-year birds based on plumage characteristics. External determination of sex in this monomorphically-plumaged species has been possible only through the presence of the brood patch in incubating females. This note reports a method for determining sex of Black-billed Magpies using external measurements.

Magpies were trapped at 2 locations, 26 km apart in Cache County, northern Utah, between 1 January and 1 June during 1978, 1979, and 1980. Each bird was aged according to Erpino (1968). Sex was determined in nesting females by the presence of a brood patch and in other birds by laparotomy (Risser, Condor 73:376–379, 1971). Five body measurements were recorded from each bird: (1) weight (g) by a 300 g Pesola scale, (2) tail length (mm) from the uropygial gland; (3) wing chord (mm) as length of the right wing closed in a natural position, (4) culmen length (.1 mm) by calipers from the tip of the bill to the base of the forehead; and (5) tarsus length (0.1 mm) by calipers from the notch on the back of the right intertarsal joint to the ventral surface of the foot with toes extended.

None of the variables had correlations greater than 0.75 and all were retained for further analysis. Univariate comparisons (*t*-tests) were conducted for each variable between age classes of each sex and between sexes. To discover which variables were useful for determining the sex of magpies, we conducted a stepwise discriminant function analysis (DFA) using RAO-V for both sexes (Nie et al., SPSS, 2nd ed., McGraw-Hill, New York, 1975). Measurements from 71 birds—41 males (7 adults, 34 juveniles) and 30 females (8 adults, 22 juveniles)—were entered into the analysis.

For males, only tail length was different between age classes (mean ± SD; adult $\bar{x}$ = 298.9 ± 19.63 mm, juvenile $\bar{x}$ = 282.4 ± 15.27 mm, P = .018). However, due to overlap in the range of values, this variable alone could not be used for aging males (only 10% aged correctly), sexing juveniles (14%), or sexing adults (27%). For female age classes, only tarsus length was different (adult $\bar{x}$ = 49.1 ± .78 mm, juvenile $\bar{x}$ = 47.6 ± 1.59 mm, P = .002). Due to overlap in the range of values, this variable alone was unsatisfactory for aging females (only 30% aged correctly), sexing juveniles (12.5%), or sexing adults (27%). For overall comparison of sexes, age classes of each sex were combined.

Differences between male and female body measurements were significant for all variables (Table 1). No single variable could correctly determine the sex of more than 23% of the birds due to overlap in the ranges.

Initial results of DFA produced a function that classified 88.7% of the magpies into the correct sex (37 of 41 males, 26 of 30 females). The 4 misclassified males were juveniles, small in all measurements. The misclassified females were 2 adult and 2 juveniles that weighed over 190 g. These females, captured during the egg-laying period, were heavy due to large, developing follicles that were evident during laparotomies. Weight could not be eliminated from the DFA because its relative contribution to the discriminant function was 51.3% (based on standardized canonical coefficients). To improve the discriminating power of the data, all magpies measured during the peak of egg-laying, i.e., 25 March to 20 April, were eliminated (1 male, 5 females).

The DFA was repeated with 65 birds (40 males, 25 females) with 95.4% classified correctly. All females were correctly classified, as were 37 of 40 males. The linear equation was based on 3 variables; weight (WT), wing chord (WC), and culmen length (CL) in the form: Discriminant Score (DS) = (WT × .043) + (WC × .122) + (CL × .264) − 40.952. In practice, the sex of a magpie from northern Utah could be determined (with 95% accuracy) by measuring the variables and calculating the DS. If the DS was positive, the magpie was a male, if negative or 0, a female.

This method of determining the sex of Black-billed Magpies would be accurate only from 1 January to 25 March and 20 April to 1 June. Birds captured during the peak weeks of egg-laying should be eliminated due to the large increase in weight of breeding females. Behavioral differences between sexes can be used at this time to determine the sex of pair members (Erpino, Condor 71:267–279, 1969). Molting birds cannot be sexed using this function, nor (due to changes in weight and wing chord) can rapidly growing

TABLE 1. Comparison of body measurements of male and female Black-billed Magpies from northern Utah.

Variable	Sex[a] Male (41)[b]	Female (30)
Weight (g)	187.8 ± 10.49 (163–206)[c]	166.7 ± 12.44 (145–197)
Tail length (mm)	285.3 ± 17.34 (258–326)	264.1 ± 18.60 (230–306)
Wing chord (mm)	206.5 ± 4.77 (192–216)	196.7 ± 5.90 (185–209)
Culmen length (mm)	33.8 ± 2.00 (30.4–37.4)	30.6 ± 2.09 (26.8–36.8)
Tarsus length (mm)	50.4 ± 1.51 (46.4–53.4)	48.0 ± 1.56 (44.5–51.9)

[a] All variables were different between sexes at $P < .001$.
[b] Sample size.
[c] Mean ± 1 SD (range).

juveniles during fall. Sex of fall-captured adults should be examined before using this method, since our analysis included no birds from the fall. If differences in external measurements between populations are suspected, researchers in other geographic locations may want to determine their own criteria based on these 3 variables.

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Prey of a Wintering Long-eared Owl in the Nashville Basin, Tennessee.—The Long-eared Owl (*Asio otus*) has been reported only infrequently in the Nashville Basin of middle Tennessee (Spees 1975, Parmer 1975). While numerous food habit studies have been reported for the Midwest where this owl is a permanent resident (e.g., Cahn and Kemp 1930, Geis 1952, Kirkpatrick and Conway 1947, Weller et al. 1963, Wilson 1938), few have been published for its winter range (e.g., Randle and Austing 1952) and none for the Southeast.

The Long-eared Owl reported here was first sighted in mid-February, 1981, when it was flushed from a small redcedar, *Juniperus virginiana,* ca 13 km ESE of Columbia, Maury Co., Tennessee. Pellets were found on leaves within an area no larger than 50 cm in diameter below where the owl had been roosting (ca 4 m from the ground). All pellets on top of the leaves were fresh and were collected individually. Beneath the leaves that had fallen during 1980, a matrix of decayed deciduous leaf litter and cedar needles contained an abundance of small bones which were also collected.

On 29 January 1982 a Long-eared Owl was sighted again on the same small limb. By 24 March 1982 the roost was no longer in use and pellets from beneath the roost were collected. Seventy-one complete pellets were collected during 1981 and 1982; these averaged 42 ± 10 mm in length and 21 ± 3 mm maximum width.

The area surrounding the roost site included openings of grasses, herbs, and shrubs in cedar-hackberry-elm glades which met habitat requirements of this owl of dense trees (i.e., *Juniperus virginiana*) for roosting and open areas for hunting. The structural heterogeneity of this environment was supplemented by recently (≤5 years) abandoned pastures that supported a dense grass cover within ca .5 km.

The Long-eared Owl has been characterized as a restricted feeder that preys primarily on only a few small mammal species. Marti's (1976:333) review of *A. otus* food habits