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DIAGNOSABILITY OF SUBSPECIES: LESSONS FROM SAGE SPARROWS  
 (*AMPHISPIZA BELLI*) FOR ANALYSIS OF GEOGRAPHIC VARIATION  
 IN BIRDS

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THE VALIDITY AND utility of subspecies is an enduring subject of controversy in systematic ornithology. In a set of commentaries in *The Auk* more than two decades ago, numerous authors contributed personal views on avian subspecies and reaffirmed the validity of the concept despite its frequent misapplication (Barrowclough 1982, Gill 1982, Johnson 1982, Lanyon 1982, Mayr 1982, Monroe 1982, O'Neill 1982, Parkes 1982, Phillips 1982, Storer 1982, Zusi 1982). More recently, the subspecies rank was reviewed in light of molecular data (Zink 2004), with the conclusion that named subspecies commonly mislead taxonomy, evolutionary studies, and conservation policy. Because morphology and molecules may show discordant patterns of geographic variation (e.g. Zink 1996, Fry and Zink 1998), and because subspecies are traditionally defined on the basis of morphological criteria, rigorous analysis of morphology is crucial for proper classification at the subspecies level.

Patten and Unitt (2002) reviewed the debate and contended that taxonomists too often have diagnosed avian morphological subspecies on the basis of calculated mean differences among populations rather than an objectively defined level of diagnosability. Although admitting that “the lower boundary for defining a valid diagnosable subspecies is arbitrary” (Patten and

Unitt 2002:28), they proposed that the level of diagnosability should be defined formally for the trait of interest so that 75% of its distribution in one set of populations falls outside of 99% of the distribution of the other set of populations being compared (the “75% rule”; Amadon 1949). Patten and Unitt (2002) used museum specimens of subspecies of Sage Sparrow (*Amphispiza belli*) to illustrate their thesis and claimed that *A. b. canescens* Grinnell, 1905—a name long applied to breeding populations in the San Joaquin Valley and Mojave Desert of California and the Grapevine Mountains of Nevada—is not diagnosable from *A. b. nevadensis* by the 75% rule despite significant differences in size (mainly wing length), as demonstrated in their study and others (Grinnell 1905, Johnson and Marten 1992). Hence, they synonymized *A. b. canescens* under *A. b. nevadensis*.

Overall, we agree with Patten and Unitt (2002) regarding the importance of diagnosability, and we recommend their review to systematists and others wishing to place morphological subspecies on a more objective footing than has often been the practice. However, because their results for *A. b. canescens* and *A. b. nevadensis* are at such variance with morphological differences reported by Johnson and Marten (1992) for specimens in the Museum of Vertebrate Zoology (MVZ, University of California, Berkeley), as well as with data for additional males and females from this collection, we suspected that their analyses and findings masked real patterns of geographic variation.

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