A new genus for the American Tree Sparrow (Aves: Passeriformes: Passerellidae)

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The genus Spizella (Bonaparte) contains seven species of North American sparrows in the recently resurrected family Passerellidae (Bock 1994; Barker et al. 2013), formerly placed in the Emberizidae, and includes a few of the region’s most common and familiar bird species. Spizella sparrows occupy more or less open habitats; most species are at least partially migratory and form small flocks when not breeding. On the basis of their similar morphology and behavior, they have long been treated as a natural group (Ridgway 1901; American Ornithologists’ Union 1998).

Mayr and Short (1970) suggested that the American Tree Sparrow Spizella arborea (Wilson) had no close relatives but did not provide a rationale for their assertion. Two early molecular studies found S. arborea to be divergent from the other species of Spizella, on the basis of mtDNA restriction fragment length polymorphisms (Zink & Dittmann 1993) and cytchrome b mitochondrial (mtDNA) sequences (Dodge et al. 1995), although taxon sampling in both studies was limited. Zink and Dittman observed that the mean genetic distance between S. arborea and other species of Spizella was greater than that between S. arborea and Junco hyemalis (Linnaeus), and recommended that Spizella be tested for monophyly. Dodge et al. (1995) observed polyphyly of Spizella involving S. arborea, depending on which non-Spizella outgroups they included in their analysis. However, they stopped short of concluding that Spizella is polyphyletic in light of limited taxon sampling and possible long-branch attraction issues (Felsenstein 1978) in their phylogeny.

Dodge et al. (1995) observed polyphyly of S. arborea and Junco, while the rest of Spizella formed a monophyletic group distant from S. arborea. The mtDNA tree (based on ND2 sequences) of Klicka et al. (2014) strongly supported a sister relationship between S. arborea and Passerella iliaca, with long branches separating the two (also see Barker et al. 2013). The less resolved nuclear DNA tree of Klicka et al. (2014) strongly supported the placement of S. arborea within the Passerella-Zonotrichia-Junco clade, although it failed to support the sister relationship between Passerella iliaca and S. arborea. Using species tree inference, Klicka et al. (2014) found S. arborea, Passerella, Zonotrichia, and Junco to form a four-way polytomy, distant from other species of Spizella.

Multiple studies now corroborate that the genus Spizella is polyphyletic; hence, S. arborea and the rest of Spizella belong in separate genera. The type species of Spizella, by original designation, is Fringilla pusilla (Wilson). Spizella pusilla is part of a monophyletic group that includes all other Spizella species except S. arborea (Klicka et al. 2014). Thus, the genus Spizella should be restricted to this group, and S. arborea should be placed in a different genus.

Given the phylogenetic relationships described above, three options exist for the generic placement of S. arborea: 1) place S. arborea in a monotypic genus, 2) merge S. arborea into Passerella, or 3) merge S. arborea, Passerella, Zonotrichia, and Junco into a single genus. The long branches subtending S. arborea and Passerella iliaca on the mtDNA tree indicate that these two lineages are relatively ancient. Merging both into Passerella (see Rising 2011) overlooks the morphological and genetic distinctiveness and long independent histories of these two taxa. Although the merger of Passerella and Zonotrichia with (Short & Simon 1965) and without (Paynter 1964) Junco has been proposed, such notions have never included S. arborea, but instead have proposed that Melospiza, now known to be only distantly related (Klicka et al. 2014), forms part of this group (Dickerman 1961). Given that the strong phenotypic differences and deep phylogenetic divergence among these four genera are on par with divisions between other sparrow genera (Klicka et al. 2014), we feel that Passerella, Zonotrichia, and Junco should be retained and that placing S. arborea in a monotypic genus is warranted. Spizella arborea has been previously placed in seven other genera: Emberiza, Fringilla,
Passer, Passerella, Passerina, Spinites, and Zonotrichia (Baird et al. 1901; Ridgway 1901; Hellmayr 1938; Rising 2011). However, S. arborea is not the type species of any of these genera (Baird et al. 1901; Ridgway 1901; American Ornithologists’ Union 1998). Because no generic name is currently available for the American Tree Sparrow, we describe a new genus:

**Spizelloides**, gen. nov.

**Type species.** Fringilla arborea Wilson, currently Spizella arborea.

**Included species.** Spizelloides arborea (Wilson) comb. nov., American Tree Sparrow.

**Diagnosis.** Distinguished from all extant species of Spizella, Passerella, Junco, and Zonotrichia by (1) a yellow lower mandible contrasting with a black upper mandible and (2) strongly divergent molecular characters (Klicka et al. 2014). Further distinguished from the six species of Spizella—atrogularis (Cabanis), breweri (Cassin), pallida (Swainson), passerina (Bechstein), pusilla (Wilson), and wortheni (Ridgway)—by (1) distinctive plumage features including rufous crown, rufous postocular stripe, and pale gray underparts with a dark central breast spot; (2) larger size on average (wing chord 67–82 mm, tail 60–74 mm; Pyle 1997); and (3) lateroventral process (LP) of the laterosphenoid 0.8–1.3 times the length of the zygomatic process (ZP) and with a wide, flat tip (vs. LP short (0.1–0.4 times the length of the ZP) in five species of Spizella; S. wortheni not examined; Patten & Fugate 1998). Further told from Passerella iliaca, its sister taxon according to the most complete molecular phylogeny (Klicka et al. 2014), by plumage characters, including a conspicuous lack of dense, dark streaking or spotting on the underparts. Separated from all extant species of Zonotrichia—articapilla (Gmelin), albicollis (Gmelin), capensis (Müller), leucophrys (Forster), and querula (Nuttall)—and Junco—hyemalis, phaeonotus (Wagler), and vulcani (Boucard)—species by rufous crown and, in adults, a combination of dark iris and dorsal plumage streaking.

**Description.** Spizelloides arborea is well known and many descriptions have been published elsewhere (e.g. Ridgway 1901; Naugler 1993; Pyle 1997).

**Etymology.** The generic epithet Spizelloides is formed from the sparrow genus Spizella and the Greek suffix -oidēs (resembling; Brown 1956). The name alludes to the evolutionary convergence in plumage, morphology, and behavior that led to Spizelloides arborea being considered a Spizella sparrow for many years. The gender of Spizelloides is feminine.

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