

Taxonomic Discussion

Of the several dozen nominal species of Pleistocene *Equus* published from North America, only a few are represented by sufficiently complete and abundant craniodental and postcranial elements to confidently ascertain their validity. Of this subset, five morphospecies are contemporaneous with the Paisley Caves fauna:

- 1.) A large species with stout metapodials, protocones with a moderate to strong anterior heel and a broad lingual groove, ectoflexids that reach the molar isthmus but do not penetrate it (except in some cases of advanced wear), linguaeflexids that are generally more “U”-shaped than “V” shaped, although this varies, and infundibula in the lower incisors (closed in i1-2, commonly open in i3). Following Savage (1951), Winans (1985), and Scott (2004), this morph is herein assigned to the species *Equus scotti* Gidley, 1900. Samples for this species were obtained from Fossil Lake and Silver Lake, Oregon, US. Horses from these localities have elsewhere been assigned to *E. pacificus* Leidy, 1868 (Elftman, 1931; Hu, 2009), but the nondiagnostic nature of the holotype of this species renders it a *nomen dubium* (after Savage, 1951; Winans, 1985).
- 2.) A large species with stout metapodials, protocones with a moderate to strong anterior heel and a broad lingual groove, ectoflexids that reach the molar isthmus but do not penetrate it (except in some cases of advanced wear), linguaeflexids that are generally more “U”-shaped than “V” shaped, although this varies, and no infundibula in the lower incisors. Following Merriam (1913), this morph is herein assigned to the species *Equus occidentalis* Leidy, 1865. Samples for this species were obtained from Rancho La Brea, California, US. Previous studies have challenged the validity of *E. occidentalis* (e.g.,

Miller, 1971; Winans, 1985), but it is accepted here *sensu* Merriam (1913), following Scott (2004).

- 3.) A small species with stout metapodials, protocones with a moderate anterior heel and a long posterior projection, short ectoflexids that do not reach the molar isthmus, linguaflexids that are generally more “V”-shaped than “U” shaped, although this varies, and infundibula in the lower incisors (closed in i1-2, commonly open in i3). These fossils have been assigned to *Equus lambei* Hay, 1917 (e.g. Harington and Clulow, 1973). Although recent molecular studies have suggested strong genetic congruity with extant caballines (*E. ferus* Boddaert, 1785, and *E. caballus* Linnaeus, 1758), for consistency and ease of reference we continue refer to these fossils here as *E. lambei*.
- 4.) A small species with stout metapodials, protocones with a moderate anterior heel and a long posterior projection, short ectoflexids that do not reach the molar isthmus, linguaflexids that are generally more “V”-shaped than “U” shaped, although this varies, and no infundibula in the lower incisors. Fossils exhibiting this morphology have previously been assigned to *Equus conversidens* Owen, 1869 by multiple researchers (e.g., Stock, 1950; Hibbard, 1955; Harris and Porter, 1980; Azzaroli, 1992, 1998; Dalquest and Schultz, 1992). The validity of this species has been challenged on the basis that the holotype specimen is not diagnostic (e.g., Winans, 1985). But as noted by Scott (2004), that holotype was one of many named prior to the presently accepted strict codification of zoological naming procedures. Numerous species names proposed in the late 1800s and early 1900s for Pleistocene horses are based on insufficiently diagnostic material, yet many of these names continue to be employed because they are acknowledged to refer to a distinctive morphotype. To reject these names, although

perhaps technically advisable, would result in considerable taxonomic confusion and instability. The nomen *Equus conversidens* is maintained primarily because it has a long history of use and promotes taxonomic stability.

- 5.) A small species with elongate or “stilt-legged” metapodials, protocones with a moderate anterior heel and a long posterior projection, short ectoflexids that do not reach the molar isthmus, linguaeflexids that are broadly “V”-shaped than “U” shaped, although this varies, and infundibula in the lower incisors (closed in i1-2, commonly open in i3). Among the potentially available species names for small stilt-legged horses in North America, the only well supported taxon is *Equus francisci* Hay, 1915 (see Lundelius and Stevens, 1970). Unfortunately, the holotype of this species differs from the diagnosis above in lacking infundibula in the lower incisors. Although it is possible that this lack reflects either regional differentiation or ontogenetic wear, we prefer not to employ the name for the horses under study here. Lacking any other available names, we follow Weinstock et al. 2005 and later authors, and refer to this group as NWSL (New World Stilt Legged) horses.

It is acknowledged that there are likely additional valid Pleistocene species of *Equus* in North America. However, these other species are either older than the late Pleistocene – the age of the Paisley Cave deposits – or else are represented by insufficient postcranial specimens to warrant inclusion and/or are of uncertain taxonomic validity.

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