

NOMENCLATURAL NOTE

Commentaries on different uses of the specific epithet of the large dromaeosaurid *Utahraptor* Kirkland et al., 1993 (Dinosauria, Theropoda)

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Abstract. *Utahraptor* is the largest member of the dinosaur family DROMAEOSAURIDAE and represents one of the most remarkable discoveries in recent decades. In the original description, the specific epithet *ostrommaysi* was used for naming the species in honor of two different persons, but in subsequent years the spelling *ostrommaysorum* was often used without comment or explanation. In this paper, we review the historical uses of the specific epithet of *Utahraptor* and make clarifications on the status of six different subsequent spellings. The International Code of Zoological Nomenclature (1999) does not offer any provision for forming a genitive form from two persons having different names, so the original spelling *ostrommaysi* has to be regarded as an arbitrary combination of letters, and not a correctly formed genitive form. For this reason, it is deemed to be preserved unaltered and is not subject to a justified emendation; consequently, the subsequent spelling *ostrommaysorum* is erroneous and represents an unjustified emendation and shown not to be in prevailing usage. Therefore, the name to be used for the taxon is *Utahraptor ostrommaysi*, as originally introduced.

Keywords. Nomenclature; taxonomy; Dinosauria; Theropoda; Maniraptora; *Utahraptor*; *ostrommaysi*; *ostrommaysorum*; Utah; Cretaceous.

Utahraptor ostrommaysi is the largest member of the dinosaur family DROMAEOSAURIDAE, with some specimens estimated to have reached up to 5.7 meters long and weighting roughly 500 kilograms (Kirkland et al., 1993). Fossil specimens date to the early Cretaceous period, in rock strata dated to 126 ± 2.5 million years ago, and it represents one of the most remarkable discoveries in recent decades.

In the original genus and species description, Kirkland et al. (1993) used the specific epithet *ostrommaysi* for naming the species, which represented a combination of names in honor of two different persons, John Ostrom and Chris Mays. Subsequently, Kirkland et al. (1997, 1998, 1999, 2016a, 2016b), and Kirkland & Madsen (2007), surprisingly used a different spelling for the specific epithet of the species, *U. ostrommaysorum*, without any comment or explanation, as did the works of Senter et al. (2012a), Senter et al. (2012b), and Milàn et al. (2015), of which J. I. Kirkland was a co-author, again without any comment or explanation. Therefore, in the last 25 years the species have been reported in the literature by mainly (but not only) two different names.

In this paper, we review the historical uses of the specific epithet of *Utahraptor* and make clarifications on the status and validity of the different spellings based on the express application of the nomenclatural rules. In order to discover the origin of the use of *ostrommaysorum*, instead of *ostrommaysi*, we have examined the published literature that mention *Utahraptor*, from the original description in 1993 up to and including 2017. Our search resulted in 57 works that make reference to *Utahraptor*, being 42 journal articles, five books and six book chapters, totaling 53 peer-reviewed works, as well as four doctoral theses. Among them, 27 (ca. 47%) use the original spelling *ostrommaysi*, while 28 (ca. 49%) use the subsequent *ostrommaysorum*. In a few cases, two (Gianechini, 2014) or even three different spellings (Norell et al., 2006; Kirkland et al., 2016b) were used in a same work. Apart from those two spellings, five other were found in the literature: *U. ostromaysi* (in Taniguchi, 2004), *U. ostromaysorum* (in Carpenter, 2006; Kirkland et al., 2016b; and Suarez et al., 2017), *U. ostrommaysorum* (in Allain & Taquet, 2006), *U. ostrommayorum* (in Kirkland et al., 2016b), and *U. ostromaysori* (in Norell et al., 2006). All the references for each spelling are summarized in table 1.

Therefore, six subsequent spellings (i.e., different from the original *ostrommaysi*) have been used for the species in the consulted literature. All authors who used those subsequent spellings did not offer any comment or explanation, and all the above mentioned subsequent spellings are considered incorrect subsequent spellings, under the rules of the ICZN. There is however one exception; indeed, Olshevsky (2000: 98–99) wrote:

“*U. ostrommaysorum* Kirkland, Burge & Gaston 1993 *emend.* Olshevsky, 1993
= *Utahraptor ostrommaysi* Kirkland, Burge & Gaston 1993

NOTE: [...] According to ICZN, articles 31a[ii] and 32c, the species epithet *ostrommaysi* must be corrected to *ostrommaysorum* because it honors two persons.”

However, Olshevsky (2000: 98–99) reached an erroneous conclusion, and thus created an unjustified emendation. This is because third edition of the Code (ICZN, 1985) does not offer any provision for forming a possessive or genitive form from two persons having different names. Article 31a[ii] reads: “A species-group name, if a noun in the genitive case, formed directly from a modern personal name is to be formed by adding to the stem of that name -i if the personal name is that of a man, -orum if of men or of man (men) and woman (women) together, -ae if of a woman, and -arum if of women; the stem of such a name is determined by the action of the original author when forming the genitive”. The article deals with the formation of a genitive case for two or more persons having the same name, not for two persons having different names. In other words, the spelling *ostrommaysorum* would refer to two or more persons, including at least one man, bearing the name Ostrommays. Article 31.1.2 of the current Code (ICZN, 1999), has the same wording. In Olshevsky (2000), the indication “*emend.* Olshevsky, 1993” refers seemingly

Table 1. Original and subsequent spellings for the specific epithet of *Utahraptor* used in the literature from 1993 to and including 2017.

Spelling	References
<i>U. ostrommaysi</i>	Kirkland et al. (1993), Witmer (1997), Brit et al. (2001), Ruiz-Omenaca & Canudo (2003), Kiernan & Schwimmer (2004), Hwang et al. (2004), Norell & Makovicky (2004), Weishampel et al. (2004), Canudo et al. (2005), Samman (2006), Norell et al. (2006), Senter (2007), Novas et al. (2009), Hu et al. (2009), Longrich & Currie (2009), Erickson et al. (2009), Zheng et al. (2010), Paul (2010), Agnolin & Novas (2011), Novas et al. (2012), Agnolin & Novas (2013), DeCourten (2013), Gianechini (2014), DePalma et al. (2015), Hendrickx (2015), Xu et al. (2015), Carvalho (2017)
<i>U. ostrommaysorum</i>	Kirkland et al. (1997, 1998, 1999, 2016a, 2016b), Barsbold & Osmolska (1999), Olshevsky (2000), Norell et al. (2001), DiCroce & Carpenter (2001), Rauhut & Xu (2005), Corfe & Butler (2006), Norell et al. (2006), Kirkland & Madsen (2007), Turner et al. (2007a), Turner et al. (2007b), Turner et al. (2011), Gianechini et al. (2011), Senter et al. (2012a, 2012b), Lucas et al. (2012), Turner et al. (2012), Evans et al. (2013), Gianechini (2014), Milàn et al. (2015), Parsons and Parsons (2015), Paul (2016), Watanabe (2016), Gianechini et al. (2017), Britt et al. (2017)
<i>U. ostromaysi</i>	Taniguchi (2004)
<i>U. ostromaysorum</i>	Carpenter (2006), Suarez et al. (2017), Kirkland et al. (2016b)
<i>U. ostromayssorum</i>	Allain & Taquet (2006).
<i>U. ostromayorum</i>	Kirkland et al. (2016b)
<i>U. ostrommaysori</i>	Norell et al. (2006)

to a prior publication of the author. It could be Olshevsky (1993a), Olshevsky (1993b) or Olshevsky (1993c). However, we were unable to find a copy of any of those three works, where the subsequent spelling *ostrommaysorum* was most likely first introduced. Anyway, after publication of one of those works by Olshevsky, the name *ostrommaysorum* was often used for the taxon.

What is the true nature of the original spelling *ostrommaysi* Kirkland et al., 1993? Under Art. 11.3, it has to be regarded as an arbitrary combination of letters, and not a correctly formed name in the genitive case according to Arts. 31.1.1 or 31.1.2. For this reason, it is deemed to be preserved unaltered and it is not subject to a justified emendation. According to Art. 32.2, “The original spelling of a name is the ‘correct original spelling’, unless it is demonstrably incorrect as provided in Art. 32.5.” Here, not a single subarticle of Art. 32.5 is applicable. As a result, the spelling *U. ostrommaysorum* Olshevsky in Olshevsky, 2000 represents an unjustified emendation, and is thus a junior objective synonym of *U. ostrommaysi* Kirkland, Gaston & Burge, 1993 (Art. 33.2.3).

It is worth mentioning that different interpretations of Art. 31 led some authors to argue that any nomen based on personal names should not be modified in any circumstances,

except in only a few, rare cases, and that different subsequent spellings represent unjustified emendations (see Brandon-Jones et al., 2007 and Dubois, 2007 for this rationale). Hence, following either the traditional interpretation of the code or the arguments present in those papers, the spelling *U. ostrommaysorum* represents an unjustified emendation. A similar situation can be seen in the name of the dwarf snake *Calamaria lowi ingermarxi* Darevsky & Orlov, 1992, which was formed in honor of two persons having different surnames, R. F. Inger and H. Marx. This case also represents an example of an arbitrary combination of letters, as accepted in Art. 11.3, and is not subject to emendation (Michels & Bauer 2004, Dubois 2007).

According to the Art. 33.2.3.1, “when an unjustified emendation is in prevailing usage and is attributed to the original author and date it is deemed to be a justified emendation”. Also, according to the Art. 33.3.1 “when an incorrect subsequent spelling is in prevailing usage and is attributed to the publication of the original spelling, the subsequent spelling and attribution are to be preserved and the spelling is deemed to be a correct original spelling”. As stated by Glossary of the Code, prevailing usage is “that usage of the name which is adopted by at least a substantial majority of the most recent authors concerned with the relevant taxon, irrespective of how long their work was published”. As shown above, the subsequent spelling *ostrommaysorum* was used in 28 of the 57 works that mention the taxon, representing a percentage of ca. 49%, which is far from representing a “substantial majority”.

In conclusion, for all the above reasons, based on the strict application of ICZN (1999) regarding both the formation of species-group names and the conditions under which prevailing usage should be taken into account, the name to be used for the taxon is *Utahraptor ostrommaysi*, as originally introduced by Kirkland et al. (1993).

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