Brief report

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A revised name and new insights into the Middle Jurassic sauropod trackways from Portugal. A correction of Santos et al. 2009

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The Galinha dinosaur tracksite (Portugal) was declared a Natural Monument in 1996 and is currently designated as Ourém/Torres Novas Dinosaur Footprints Natural Monument. This tracksite yields a completely new and unique morphology of sauropod tracks from the Middle Jurassic (Bajocian–Bathonian). This new morphotype was named *Polyonyx* by Santos et al. (2009). However, recently it has been brought to our attention that this ichnotaxon name "*Polyonyx*" is preoccupied by the porcellanid decapod *Polyonyx* Stimpson, 1858 (Crustacea: Decapoda: Anomura: Porcellanidae). The priority is given to the latter and to avoid homonymy, the former is issued the new replacement name *Galinhapodus* igen. nov., creating the new replacement combination name *Galinhapodus gomesi*.

Introduction

Middle Jurassic (Bajocian–Bathonian) sauropod trackways were described by Santos et al. (1994, 2009) at the Galinha tracksite, located in a limestone quarry in the municipal area of Bairro, 10 km from Fátima, within the Maciço Calcário Estremenho (Portugal). The Galinha tracksite is one of the rare locations globally where long Middle Jurassic sauropod dinosaur trackways can be found and yield a completely new and unique track morphology. This morphology was assigned to a new sauropod ichnotaxon, *Polyonyx gomesi*, established and diagnosed by Santos et al. (2009: 409–422). The authors considered non-neosauropod eusauropods, likely from the Turiasauria clade, as possible trackmakers, suggesting that wide-gauge sauropod trackways were not exclusively produced by Titanosauriformes (Santos et al. 2009; Castanera et al. 2016; Meyer et al. 2018). Subsequently, various authors have compared the *Polyonyx gomesi* morphotype to sauropod tracks of the Middle Jurassic to Early Cretaceous age (e.g., Royo-Torres 2009; Alcalá et al. 2014; Castanera et al. 2014; Xing et al. 2014, 2016; Torcida et al. 2015, 2021; Moreau et al. 2020; Poropat et al. 2021; Tomaselli et al. 2021). However, thus far, only sauropod tracks from the Middle–?Upper Jurassic of Morocco have been tentatively referred to this ichnogenus (Oukassou et al. 2019; Klein et al. 2023). This uniqueness underscores the significance of this ichnotaxon, making the type locality (Galinha) a reference tracksite for the study of sauropod ichnology.

Recently, it has been brought to our attention that the name *Polyonyx* used by Santos et al. (2009) for this sauropod ichnotaxon is preoccupied by the decapod *Polyonyx* Stimpson, 1858 (Crustacea: Decapoda: Anomura: Porcellanidae). According to the Principle of Homonymy, Article 52.1, of the International Code of Zoological Nomenclature, therein the Code, "when two or more taxa are distinguished from each other they must not be denoted by the same name" (ICZN 1999). It is important to remember that the Code provisions apply to both living animals, fossils, and ichnotaxa, as noted in Article 1.2.1.

Article 52.3 of the Code, also known as the Principle of Priority, states that when two or more names are homonyms only the senior one can be considered valid. Therefore, and according to both Article 52.3 and Article 53.2, *Polyonyx* Stimpson, 1858, is the senior homonym, and *Polyonyx* Santos et al., 2009, is the junior homonym. Because the name *Polyonyx* has been consistently used since 1899 as a genus of decapod porcelain crab, with a new species being described as recently as 2022 (Osawa and Sato 2022), it has priority over *Polyonyx* Santos et al., 2009. According to Article 60 (Replacement of junior homonyms), specifically Article 60.1, "a junior homonym [Art. 53] must be rejected and replaced either by an available potentially valid synonym [Art. 23.3.5] or, for lack of such name, by a new substitute name [Art. 60.3]". Because there are no synonyms available for this sauropod ichnotaxa, a new substitute name must be provided in accordance with Article 60.3, which states: "if the rejected junior homonym has no known available and potentially valid synonym it must be replaced by a new substitute name, with its own author and date; this name will then compete for priority with any synonym recognized later".

Similar situations have occurred where the names of vertebrate ichnogenera coincided with previously established names and had to be renamed to avoid homonymy. For example, Harris (1997) changed the name of the dinosaur track *Exallopus* to *Saurexallopus* because *Exallopus* was preoccupied by the polychaete *Exallopus* Jumars, 1974 (Fauchauld 1977). Lockley (2010) reported that *Walteria jeffersonensis,* proposed by Mehl (1931) and attributed to a crocodylian trackway, was renamed

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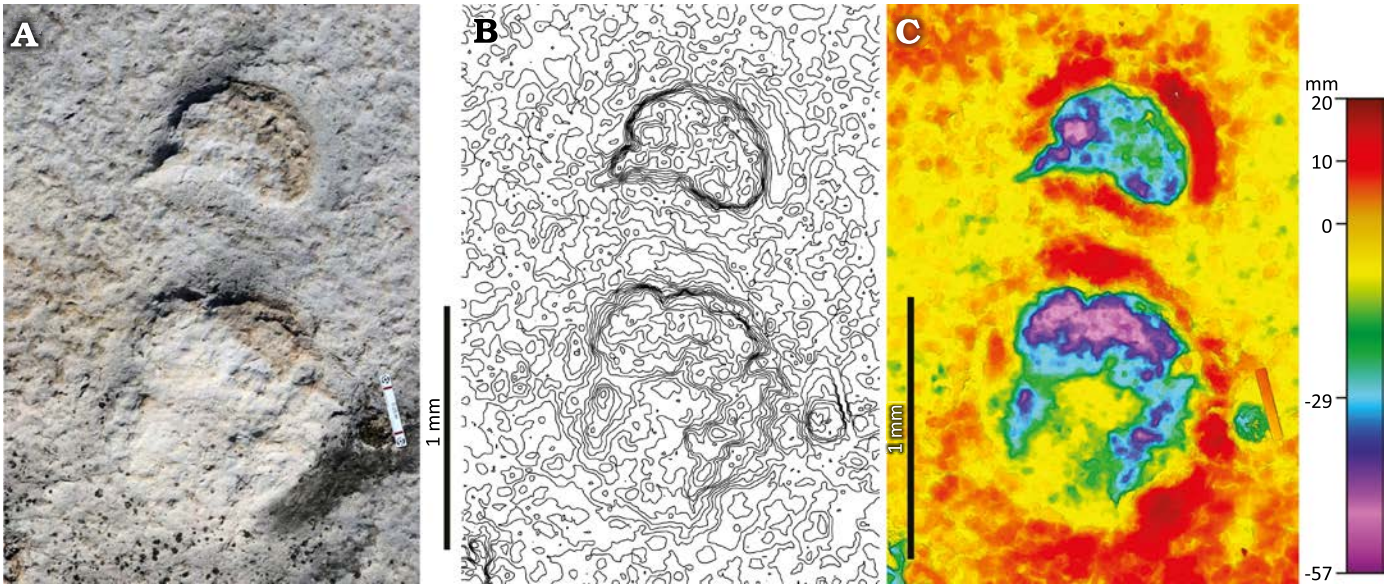

Fig. 1. Manus-pes pair from the *Galinhapodus* igen. nov. trackway G5. Photograph (**A**), contour-line outline (5 mm spacing) (**B**), and false-colour depth map (**C**) of a right manus-pes set from trackway 5 (G5) at Galinha tracksite (Bairro, Serra de Aire, west-central Portugal, Bajocian–Bathonian boundary, Middle Jurassic).

Mehliella jeffersonensis by Strand (1932) because the name *Walteria* was preoccupied by a sponge (*Walteria* Schulze, 1886). Therefore, we hereby propose a new ichnogeneric name for sauropod tracks previously referred to as *Polyonyx*.

Nomenclatural acts.—This published work and the nomenclatural acts it contains have been registered in ZooBank: urn:lsid:zoobank.org:pub:D8F4A564-D0F1-4A4C-AA8F-89342C595512.

Systematic ichnology

Ichnogenus *Galinhapodus* nom. nov.

pro *Polyonyx* Santos et al., 2009 nec Stimpson, 1858

Zoobank LSID: urn:lsid:zoobank.org:act:0D13D0B0-3AC7-4DF1-91A0-09B74402AD7C.

Type ichnospecies: *Polyonyx gomesi* Santos et al., 2009.

Etymology: Combination of *Galinha*, to honour the name of the tracksite where this morphotype was identified. Furthermore, it is also to acknowledge the former quarry owner, Rui Galinha; and Greek *podus*, foot.

Diagnosis.—As for the type and only known ichnospecies; see Fig. 1 and SOM 1 (Supplementary Online Material available at http://app.pan.pl/SOM/app69-Santos_etal_SOM.pdf) and Morphosource (https://doi.org/10.17602/M2/M634167, https://doi.org/10.17602/M2/M623555, and https://doi.org/10.17602/M2/M623561), Santos et al. 2009: figs. 3–5.

Galinhapodus gomesi (Santos et al., 2009) comb. nov.

Holotype: An in situ sauropod trackway (trackway G5), 142 m long with 94 consecutive manus-pes print sets.

Type horizon: Serra de Aire Formation, close to the Bajocian–Bathonian boundary, Middle Jurassic (Azerêdo 1993, 2007; Azerêdo et al. 1995).

Type locality: Galinha tracksite, Municipal area of Bairro, Serra de Aire, Maciço Calcário Estremenho, west-central Portugal. This locality is the first geological site to be declared a natural monument: Monumento Natural das Pegadas de Dinossáurio da Serra de Aire (Serra de Aire Dinosaur Tracks Natural Monument) by law in Portugal (Law Decree no. 12/96 of 22nd October) and it is under the management of the Instituto da Conservação da Natureza e das Florestas.

Diagnosis.—Wide gauge sauropod trackway revealing low heteropody (manus−pes area ratio 1:2) and two autapomorphies: (1) asymmetric manus prints with large digit I marks oriented in a medial direction with a large, posteriorly oriented, triangular claw mark, and impressions of digits II–V; (2) pes prints with four claw marks: claws I–II with an anterior orientation, and III–IV laterally oriented. Manus digits II–V show a slightly bent arrangement (Santos et al. 2009).

Description.—The same as described in Santos et al. (2009: 411–413).

Remarks.—Trackway G1 from the same locality was assigned to *Polyonyx* isp. Both the similarities and differences between the holotype trackway G5 and G1 have already been noted (see Santos et al. 2009; Castanera et al. 2016), especially in the manus impressions. G1 shows the characteristic speech-bubble-shaped manus of *Galinhapodus*, but they are more symmetrical, slightly longer, and no individual digits can be clearly identified with the exception of digit I, which projects posteriomedially (instead of medially). Santos et al. (2009) concluded that "it is still uncertain which features are diagnostic at the ichnospecies level". Thus, trackway G1 is now classified as *Galinhapodus* isp.

Concluding remarks

A new replacement name, *Galinhapodus* igen. nov., is erected for sauropod tracks previously identified as *Polyonyx gomesi* by Santos et al. (2009), resulting in the new combination *Galinhapodus gomesi* comb. nov. This new name was needed

because a genus of porcelain crab (Crustacea: Decapoda) already bears the same name, something that was overlooked by Santos et al. (2009). The genus *Polyonyx*, established by Stimpson (1858), was therefore a senior homonym of that established by Santos et al. (2009). In compliance with Articles 23, 53, and 60 of the Code, the previously established name takes precedence in nomenclature, hence the proposal of the new replacement name *Galinhapodus* igen. nov.

The integration of trace fossils into the Code has made a separate code for trace fossil nomenclature unnecessary (Bertling 2007), solidifying the Code as the primary system for addressing such matters. In ichnology, names assigned to traces (ichnotaxa) are typically based on trace morphology and are often considered independently from the biological taxonomy of the organisms that created them (e.g., Bertling et al. 2006). This implies that despite the general independence, conflicts may arise between biological taxonomy and ichnotaxonomy, leading to the need for clarification. Thus, the renaming of the track to *Galinhapodus gomesi* aligns with the principles of the ICZN, ensuring compliance with established nomenclatural guidelines and addressing conflicts arising from homonymy issues.

The new replacement name *Galinhapodus* igen. nov. for these sauropod tracks pays tribute to the unique site where they were discovered and described, and in gratitude to Rui Galinha, the former limestone quarry owner, for his contribution to the preservation of this palaeontological heritage.

As a final conclusion, this work represents an example of good practices in science where a problem is identified, rectified and analysed following the guidelines of the Code.

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