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e-mail: mega@edituramega.ro

GREEK AMPHORIC EPIGRAPHY IN ROMAN OPEN DATA

Abstract: The article presents a methodology to analyze the Greek amphora epigraphy produced during the Roman Empire in its eastern part. The detailed information that appears as an abbreviated form in thousands of inscriptions distributed throughout the Roman territory is an essential element to understand the imperial socio-economic dynamics. Here we present a guide to using the Roman Open Data exploratory interface in its Greek text search section, and how, based on cases, we can determine for the first time the possible existence of a complex system of productions whose contracts would even be monthly. The relational search system makes this interface the only one that allows the user to singularize their searches, granulating them based on their experience.

Keywords: *Greek epigraphy, Digital Humanities, Open Access, Amphora, Roman Empire.*

I. INTRODUCTION

In recent decades we have seen a flourishing of studies on amphoric epigraphy, where there is more and more academic interest. An example of the popularity of this genre can be seen in the more than 3,100 users linked to the topic “Stamped amphora handles” published by the bibliographic repository Academia.edu. The fact that they are one of the most common inscriptions in archaeological excavations means there is a greater knowledgebase of their texts, images, and possible meanings. Here we present the results of the design of the online records of the Greek amphora epigraphy corpus¹, hosted in the free to access database in Roman Open Data², for future reference by those studying history and archeology. The method makes use of the prior innovation scripted within the framework of the teaching practices of the members of the CEIPAC research group³, but considering the phase of design, exploration and promotion of the digital corpus among the scientific community that has already been advanced⁴, our objective is to present its use among those who are new to the database, in addition to cases that showcase results that have already been evaluated. In the current proposal, we offer an example of its operation and benefits based on the supposed discovery of several inscriptions. Thus, to the nearly two thousand records already searchable on Greek stamps, we must add the nearly five thousand painted marks (known as *tituli picti*) that preserve Greek and Latin text on amphoras from the excavations of Pompeii⁵. The plan is to provide students

Jordi PÉREZ GONZÁLEZ

University of Alcalá, Madrid
jordi.perezg@uah.es

Oriol MORILLAS SAMANIEGO

Universitat de Barcelona
oriolmorillas@ub.edu

Manel GARCÍA SÁNCHEZ

Universitat de Barcelona
manelgarciasanchez@ub.edu

Víctor REVILLA CALVO

Universitat de Barcelona
revillac@ub.edu

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¹ REMESAL *et alii* 2013.

² REMESAL/RULL 2021.

³ REMESAL *et alii* 2008; REMESAL *et alii* 2015a; *et alii* 2015b; REMESAL/PÉREZ 2021.

⁴ BERMÚDEZ 2021.

⁵ MARTÍN-ARROYO/REMESAL 2017.

of Archeology at the University of Barcelona, as well as those of History, in the Ancient History classes – comprising about eighty students a year – with a basic tool to control a more complex epigraphy, whose message is not hidden behind a necessary textual constraint, offering other possibilities of study, aside from its Latin counterpart.

II. GOALS

General: The steps to access the Greek amphoric epigraphy records in the digital catalog hosted in Roman Open Data (<https://romanopendata.eu/greek>) are disclosed, allowing the students at the University of Barcelona and Girona to become familiar with this type of epigraphy, to know its peculiarities and to infer chronologies, origins, contents, etc. from a hypothetical discovery of future texts (Fig. 5).

Specific:

- Establish selection criteria to define the fields of greatest or least interest in the epigraphic searches. This will highlight possible improvements in the structure of the database files.

- Promote among interested students the sum of published and unpublished entries in the Greek database through the Data Emptying page (<https://romanopendata.eu/greek/dataentry>), which will require approval of the information incorporated by a validating figure for its final upload. This phase of interaction will help to improve aspects that have not been attended to in the database, or to include new ones of interest to users. The proposal for an online catalogue of Greek texts adapts to the new methodological realities of the current – and future – generations of undergraduate and graduate university students, who are increasingly accustomed to accessing historical Humanities content and sources in a fully digital context⁶.

- Identify future undergraduate or postgraduate academic programs interested in establishing the activity within their teaching programs. One example is its successful implementation within the *Màster de Recerca Històrica* of the University of Girona for the 2021/2022 and 2022/2023 courses ().

III. METHOD

Information sources

As Y. Garlan already stated (2004), the systematization and study of Greek epigraphy on amphoras is a daunting task, especially when we consider that today there are more than 300,000 known inscriptions on these ceramic vessels, a figure that increases every day⁷. There are currently more than 50 known production centres that span four centuries (I–IV AD), with two thirds originating from Rhodes, to which we can add other centres from Thasos, Sinop, Knidos, etc.

There are more and more specialists in epigraphy on the *instrumentum domesticum*, and the points of free access to these inscriptions are also increasing. Originally, the management of the various corpora was done on paper, but the

dissemination of new technologies in the Humanities has promoted the creation of digital catalogues⁸.

In 1993, Garlan proposed the creation of the *Corpus International des timbres amphoriques* sponsored by the *Union Académique Internationale* (UAI), which was joined in 1997 by the *Real Academia de la Historia* (Madrid), under the patronage of the CEIPAC group; the Academies of Austria, Portugal, Romania and Tunisia joined later. In 2022, volume 30 of its fascicles was published. For CEIPAC's Latin amphora epigraphy database, active since 1995 (<http://ceipac.ub.edu>), with nearly 52,000 files introduced since March 2011, the objective was to create an electronic corpus of all Greek amphora inscriptions of the ancient world. The development of the epigraphic records search and visualization tool seeks to analyze the data in a relational system of questions that permits access to complex answers at a statistical, typological, prosopographic, or chronological level. Its study allows us to know, in detail, the productive organization chart of the workshops and the distribution of food in the Roman Empire. The analysis of this in Big Data will allow for the recognition of patterns and singularities of the organization; Panagou's work is an interesting example of the potential of the study, as he applies techniques derived from network science to his own data (2015). The development of this online catalogue, with nearly 2,000 published records, allows us to search or select one or more records, allowing us to expand or filter the results based on our interests, unlike other similar databases that show their information as a transcripts, screenshots, or scans of the published information. It is worth mentioning the database developed by The Alexandrian Center for Amphora Studies or CEAE (<http://www.amphoralex.org/presentation.php>), focused on the Greek amphora epigraphy of the city of Alexandria, whose Graeco-Roman Museum of Alexandria houses 160,000 items. Other essentials are the Amphora Stamps of the Northern Black Sea (<http://stampsofbosphorus.ru/en>), focused on the amphorae found in the settlements of the North Pontic region, and The Amphoras Project of the University of Toronto (<https://amphoras.artsci.utoronto.ca/project.html>), which focuses on materials from the excavations of the Agora of Athens.

The methodology used is based on the practical proposals made concerning its Latin counterpart; the Latin amphora epigraphy database of the CEIPAC (viewable at <http://ceipac.ub.edu> or <https://romanopendata.eu/latin/search>). A script on its use and results among university students can be followed in various publications⁹.

Search forms

1. Search and representation of the stamps within the Greek epigraphy database (<https://romanopendata.eu/greek>).

- 1.1. The search form is mainly divided into three sections: amphora typologies; that which relates to the inscriptions printed therein; and that which relates to the discovery of the texts.

⁸ REMESAL 2012; REMESAL 2023.

⁹ PÉREZ/BERMÚDEZ 2021; PÉREZ *et alii* 2022; PÉREZ *et alii* 2022a; PALACÍN *et alii* 2017; PALACÍN *et alii* 2020 and MARTIN i OLIVERAS *et alii* 2021.

⁶ PÉREZ *et alii* 2023.

⁷ PORCHEDDU 2012.

1.2. There are several subsections of the epigraphic search field. First and foremost is the search field for the text of the stamp, in Greek (via a Greek keyboard) or its Latin transcription. This is followed by two sections on the name of the variant and the name of the person who appears on the stamp, in Latin or its transcription in Greek. Finally, the user can make a chronological search of the inscriptions, either through one of the months that appears in the text of the stamp variant, or through a relative chronology that is offered through a drop-down menu with eighty periods, as well as selectable subperiods.

1.3. The search results can be displayed in an abbreviated list, either through a general Stamps section, or within two other sections that allow users to filter the result by Variants and Persons Cited.

1.4. Once the file is selected, it opens with the epigraphic information, revealing the conservation of the text, its position, the shape of the cartouche, its reading direction, whether it features relief, whether a symbol appears next to the text, and its position on the stamp. This is followed by information about the object on which the inscription appears and the bibliography associated with it, before closing with a detailed analysis of the reading, the names of the people who appear on the stamp, the type of matrix, and the month.

– Below, we show several screenshots of the search process for the eponym or magistrate known as *Aristómachos* (Fig. 1–4). In the ‘Text’ search field, we include the complete development in Greek of the person mentioned in the epigraphic texts, for example, ΑΡΙΣΤΟΜΑΧΟΥ, offering the user 61 complete record results with a number of variants. The eponym appears on the stamps accompanied by a potter, or linked to a specific part of the year, or by itself. In addition to being a consultation tool with great potential, relational search also allows us to observe individual results, as well as other types of similar productions. For example,

the Roman province of Baetica (of the Dressel 20 type, occasionally serialised with stamps of the same reading through various variants and/or matrices), then the CIALB stamp serves as an example¹⁰. We can thus interpret that the new orders for these amphorae indirectly represent the creation of a new matrix, through which we can differentiate productions within the complex organisational system. Thanks to continuous reviews of its typological evolution¹¹ and the dating obtained through its discovery in well-defined contexts such as shipwrecks or at Monte Testaccio¹², we can propose and verify the dating of many of the known stamps (Dendrograms), providing they are associated with specific dynastic periods. At this point, knowing whether the matrices worked during certain days, weeks or months becomes a complicated task using the current information. However, the analysis of Greek epigraphy, which is more detailed than the constricted or abbreviated Latin, allows us to hypothesise that the same matrix (-matrices) could have been produced, used and eliminated throughout the monthly period, at the pace of the contracts and productions associated with them. *Aristómachos*, like many other eponyms, is a good example of this. If we select the character series emptied into the base and associated with the month Πάναμος (July-August), we see up to five different cases with the same text but different matrices. The visualisations of the matrices through their drawings, tracings or photographs often allows us to quickly differentiate the variants; however, when this method fails, a transcription of the copies allows us to confirm the variety of cases through line breaks: [Ἐπὶ Ἀρ]ιστομάχου / Παμάμου (CEIPAC 47884 (Stamp 52035)); Ἐπὶ Ἀριστομ[ά]χου / Πανάμ[ου] (CEIPAC 47883 (Stamp 52034)); Ἐπὶ Ἀριστομάχου / Πανάμου (CEIPAC 47882 (Stamp 52033)); Ἐπὶ Ἀριστομάχου / Πανάμου (CEIPAC 47881 (Sello 52032)) and Ἐπὶ Ἀριστομ[ά]χου / Πανάμου (CEIPAC 47880 (Stamp 52031)) (collected in Cankardeş-Şenol 2015). The case presented here has many other parallels that have already been

The screenshot shows the search interface of the CEIPAC Corpus de Epigrafia Griega. At the top, there are navigation tabs: 'CEIPAC', 'Corpus de Epigrafia Griega', 'Búsquedas', and 'Vaciado de datos'. Below this is the 'Formulario de búsqueda' (Search Form). It contains three main sections:

- Sello (texto)**: A text input field containing 'ΑΡΙΣΤΟΜΑΧΟΥ'. Below it is a 'Teclado griego ayuda' (Greek Keyboard Help) button and a dropdown menu for 'Texto del sello (en griego)'.
- Variante (transcripción)**: A text input field for the transcription of the variant in Greek.
- Personaje (nombre)**: A text input field for the name of the character in the variant in Greek.

 A detailed Greek keyboard layout is overlaid on the search form, showing various Greek characters and symbols.

Fig. 1. Search in the Greek Roman Open Database of the text *Aristómachos* (ΑΡΙΣΤΟΜΑΧΟΥ), alongside the drop-down Greek alphabet. Search carried out on 01/29/2024.

if we accept the theoretical framework proposed by Moros (2021) on the contractual and defining value of the batches of olearia amphorae produced throughout dozens of kilns in

¹⁰ REMESAL/MOROS 2019.

¹¹ BERNI 2017; GONZÁLEZ 2023.

¹² REMESAL 2022.

CEIPAC Corpus de Epigrafía Griega Búsquedas Vaciado de datos

Resultado de la búsqueda

Sellos Variantes Personajes

Ant. Sig. 1 2 61 registro(s) 50 registros por página lista

Número CEIPAC	47894
Conservación	ΕΠΙ ΑΡΙΣΤ[ΤΟ]ΜΑΧΟΥ ΣΤ[Ε]ΦΑΝΟΥ
Tipo anfórico	Rhodian
Lugar de hallazgo	Alexandrie, Egypt
Variante	(Aristomachos02-Stéphanos002) Επί Αριστομάχου Στεφάνου
Personaje	Αριστόμαχος II (epónymos)
Mes	
Cronología	Subperíodo IVa (c. 160 - c. 154/153)

Número CEIPAC	47893
Conservación	ΕΠΙ ΑΡΙΣΤΟΜΑΧΟΥ ΣΤΕΦΑΝΟΥ
Tipo anfórico	Rhodian
Lugar de hallazgo	Alexandrie, Egypt
Variante	(Aristomachos02-Stéphanos001) Επί Αριστομάχου Στεφάνου

Fig. 2. Screenshot of the results obtained from the Greek Roman Open Database for the text *Aristómachos* (ΑΡΙΣΤΟΜΑΧΟΥ). Search carried out on 01/29/2024.

CEIPAC Corpus de Epigrafía Griega Búsquedas Vaciado de datos

Conservación	[ΕΠΙ ΑΡΙΣΤΟΜΑΧΟΥ / ΠΑΜΑΜΟΥ
Tipo anfórico	Rhodian
Lugar de hallazgo	Delos, Greece
Variante	(Aristomachos02-Pánamos005) [Επί Αριστομάχου / Παμίμου sic]
Personaje	Αριστόμαχος II (epónymos)
Mes	Πάνωμας/Julio-Agosto/July-August
Cronología	Subperíodo IVa (c. 160 - c. 154/153)

Número CEIPAC	47883
Conservación	ΕΠΙ ΑΡΙΣΤΟΜΑΧΟΥ / ΠΑΜΑΜΟΥ
Tipo anfórico	Rhodian
Lugar de hallazgo	Delos, Greece
Variante	(Aristomachos02-Pánamos004) Επί Αριστομάχου / Παμάμου
Personaje	Αριστόμαχος II (epónymos)
Mes	Πάνωμας/Julio-Agosto/July-August
Cronología	Subperíodo IVa (c. 160 - c. 154/153)

Número CEIPAC	47882
Conservación	ΕΠΙ ΑΡΙΣΤΟΜΑΧΟΥ / ΠΑΜΑΜΟΥ
Tipo anfórico	Rhodian
Lugar de hallazgo	Delos, Greece
Variante	(Aristomachos02-Pánamos003) Επί Αριστομάχου / Παμίμου
Personaje	Αριστόμαχος II (epónymos)
Mes	Πάνωμας/Julio-Agosto/July-August
Cronología	Subperíodo IVa (c. 160 - c. 154/153)

Número CEIPAC	47881
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Fig. 3. Screenshot of the results obtained from the Greek Roman Open Database for the text *Aristómachos* (ΑΡΙΣΤΟΜΑΧΟΥ) and the Month Πάνωμας. Search carried out on 01/29/2024.

CEIPAC Corpus de Epigrafía Griega Búsquedas Vaciado de datos

Número CEIPAC 47884 (Sello 52035)

ID del sello 52035

Conservación [ΕΠΙ ΑΡΙΣΤΟΜΑΧΟΥ / ΠΑΜΑΜΟΥ

Posición del sello

Forma de la cartela rectangular

Dirección de lectura directa

Relieve en relieve

Simbolo

Posición del simbolo

Observaciones Παμίμου en vez de Πανάμου

Objeto

Número CEIPAC (ID del objeto) 47884

Tipo anfórico Rhodian

Lugar de hallazgo Delos, Delos, Greece

Lugar de conservación Delos, TD 3876, B. 20228

Bibliografía Gonca Cankardeg-Senol. Lexicon of Eponym Dies on Rhodian Amphora Stamps, vol. 1 (2015) Alexandrie

Observaciones La producción de los fabricantes Αποκλόνη(?) Αραπονής Κάσσανδρος Στέφανος Σπύριου, probablemente Φίλιππος y Φλοιστήριος II son datados por el epónimo Αριστόμαχος II. El fabricante Στέφανος aparece en dos sellos junto al epónimo.

Variante del sello

ID de la variante 1631

Lectura [Επί Αριστομάχου / Παμίμου sic]

Nombre Aristomachos02-Pánamos005

Tipo de matriz RE-ΑΡΙΣΤΟΜΑΧΟΙ 02-ΠΑΜΑΜΟΙ-005

Mes Πάνωμας/Julio-Agosto/July-August

Fig. 4. Screenshot of the file CEIPAC Number 47884 (Stamp 52035) of the Greek epigraphy database, searchable in Roman Open Data. Search carried out on 01/29/2024.

added to the base, which serve as a clear example of its potential use.

2. Search and representation of the *tituli picti* in the Latin epigraphy database (<https://romanopendata.eu/latin/search>).

2.1. The categorisation of the *tituli picti* (mostly in Greek) carried out by Martín-Arroyo for his digital casting¹³, of more than 3000 amphorae exclusively from the Vesuvian region, in particular from Pompeii and Herculaneum, added more than 5,800 Greek and Latin inscriptions – at times on the same ceramic container – to the Ceipac bases, which are freely accessible through Roman Open Data. The search form is divided into several sections: amphora typologies; that which relates to the inscriptions printed therein; the position of the texts; their chronology; that which relates to the discovery of these texts or their production; and the bibliography of the inscription.

2.2. Focusing a search on Greek inscriptions is done by using the text search field of the *titulus pictus*, by using the Greek keyboard or, failing that, the pre-established search in Latin. It is important to select the ‘*Tituli*’ field in the search results displayed at the bottom of the catalogue.

2.4. Once the list of results obtained has been selected, it opens with the following specific epigraphic information: the amphora type where the text or texts appear; its place of discovery and conservation; its dating; and its bibliography. A subsection is included with the development of textual conservation, as well as the class and ink of the *tituli picti* that appear on the amphora.

IV. RESULTS

In the hypothetical case that we give students the text of a Greek *titulus pictus* with the remains of the text *Κλαυδ...* on an amphora found in Pompeii and an incomplete seal *Ἀριστό...* made on a Rhodian oriental amphora, are there parallels in the CEIPAC databases? The answer is yes – there are more than fifty developed records of *tituli picti Claudiorum*, *Τι. Κλαυ(δίου)*, etc., and more than four hundred stamps with the names *Ἀριστόμαχος*, *Ἀριστοκλῆς*, *Ἀριστεΐδας*, etc. In this way, students would be able to find an answer to these texts.


We will now demonstrate the basic questions needed for the elaboration of a work on amphora epigraphy. First, we describe the shape of the inscriptions: does it have a cartouche? Are there reverse letters or interpunctures? etc. Second, we determine from the information in the database the conservation, proposed developed reading, place of production, distribution throughout the Roman territory (which can be found at <https://romanopendata.eu>), dating, amphora type, types of content, etc. What historical data can we extract from this text? If we find it in an excavation, would it be useful to us? To all this, we must add a brief bibliography, adjusting it to the length of the work and the norms of bibliographic citation. More information on the use of Ceipac databases can be found in these two video tutorials (https://www.youtube.com/watch?v=Cwt3XlO02rI&feature=emb_logo&https://www.youtube.com/watch?v=Xpo612g2lSA&feature=emb_logo).

The assumptions made in these search criteria and the preparation of the work are reflected by a success rate of greater than 90% for the works carried out each year at the University of Barcelona (about 40–50 students) and the University of Girona (with a total of 4 students from the 2021/22 and 2022/23 courses).

1. AENEAS

Forma del segell: Segell in *littera extantibus*, situat dins una cartel·la rectangular i de lectura directa. La lletra N i la S apareixen a la inversa. No s'observen interpuncions.

Lectura del segell: AENEAS. Conservació: |AEnEAS|



MANACORDA & PALLECCHI 2012
(sin escala)

Lectura desenvolupada proposada: Mesura de la cartel·la: 57x11.5 mm. Mida de les lletres (mm): A:10x11; E:6x9; N:7x10; E2:6x8; A2:9x7; S:4x4. Direcció de la lectura en sentit descendent (Manacorda&Pallec. (2012).

Lloc de producció i de trobada: Brindisi (Giancola, Itàlia), Att. 28, US 25

Datació: Per. IID. 100-75 aC. (contextual).

Tipus d'àmfora: Brindisi. Tipo Aeneas A2 (Manacorda&Pallec. (2012). És una àmfora de coll cilíndric amb una vora plana engrossida, mentre que les nanses són de secció rodona i s'uneixen des de sota de la vora fins a l'espatlla. El cos és ovalat amb una base novellada. Les nases normalment estan estampades en llatí, però també apareixen caràcters grecs (Grace, 1962; Manacorda, 1994). A vegades, un mànec porta el nom de la fàbrica, mentre que l'altre conté el suposat nom del terrisser en qüestió.

Tipus de contingut: Probablement, oli d'oliva, però també hi ha la possibilitat d'haver contingut vi (Panella, 1973, Manacorda, 1990).

Pel que fa la distribució arreu del territori romà, 25 de les 26 inscripcions estudiades han estat localitzades a Brindisi, al *Canale Giancola*, Itàlia. La inscripció restant es va trobar a Hemopolis, Egipte. Les àmfores d'aquesta forma es troben àmpliament distribuïdes pel Mediterrani occidental en zones com la Lusitania (Fabião, pers.comm.), però predominen en la part oriental en territoris com Dalmàcia, Grècia i Àsia Menor Tchernia, 1969; Sciarra, 1972; Manacorda, 1990, Bezeczky, 2001). Referent a l'origen d'aquestes àmfores, es coneixen diversos foms a Apani, Giancola, Marmorelle i “La Rosa”, prop de Brindisi (Tchernia, 1969; Baldacci, 1972; Sciarra, 1964; 1966; 1972; Manacorda, 1990; 1994; 2001; Palazzo, 1989; 1990; 1993; 1994; Palazzo & Silvestrini 2001).

Segons això, les dades històriques ens permeten determinar que la producció d'aquesta tipologia d'àmfora i de segell és pròpia de la regió sud de la península italiana i que la seva zona d'acció era la mar Mediterrània.

Per tant, en el cas de trobar aquest segell en una excavació arqueològica, seria important si la localització fos alguna de la vessant occidental del Mediterrani, ja que en aquesta zona es coneixen menys exemplars i això permetria establir possibles noves rutes de comerç o àrees comercials de nova distribució.

Fig. 5. Capture of the anonymous response of a work on the *AENEAS* stamp proposed in the *Màster en Recerca en Humanitats* of the University of Girona for the 2022/23 course.

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¹³ MARTÍN-ARROYO/REMESAL 2017.

economies, societats (2021 SGR 00246); Gynaikes, Mulieres: Mujeres, Dones, Emakumeak, Mulleres de Grecia y Roma, FCT-20-16887 and CLIOGEN, GINDO-UB/187. JPG – member of ‘The ancient world at Alcalá’ (Coord.: Prof. J. Justel; UAH).

V. CONCLUSIONS

Spain has one of highest concentrations of studies on amphoric epigraphy, and its academic-social diffusion is evident in the varied and continuous publications on the subject. The sum of the epigraphic search processes in digital catalogs is one of the most recognized teaching practices in Epigraphy classes at the University of Barcelona and, by extension, at the University of Girona. The development of the Greek epigraphy databases within the framework of the CEIPAC projects seeks to offer the user new search experiences that are not found in other online catalogs, as well as to partner with institutions that provide data, resources and specialists on this epigraphy. Along these lines, CEIPAC has recently signed an agreement that links it to the Institute of Historical Research/National Hellenic Research Foundation through the Roman Attica Project.

It is thus important to generate new evaluable practical exercises from the databases developed following previous experiences in order to improve them and help validate their data. In parallel, several papers have already been published that analyze either the distinctiveness of various productions or marketed products, or the supply dynamics in a Big data context, thus overcoming the merely cumulative or academic dissemination phase of the software developed¹⁴.

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¹⁴ MARTÍN-ARROYO 2019; MARTÍN-ARROYO 2020a; MARTÍN-ARROYO 2020b and MORILLAS 2023.

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