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QUANTIFYING LARGE SCALE ANALYSIS AND TYPOLOGY OF COARSE WARE FROM *FLAVIA SOLVA*, *NORICUM*

The authors of this paper are part of the project team “Examining the finds from Flavia Solva” and are responsible for the archiving and the scientific analysis of the coarse ware. Large parts of the city have been excavated by the Universalmuseum Joanneum, starting over 140 years ago. Since February 1, 2021, the previously unexamined find material from the above-mentioned excavations has been prepared and archived in a standardized form. The aim of the project is to fully classify and digitally archive the finds in a database, completely digitize the historical documentation, and to carry out a selective, concise scientific examination followed by the subsequent publication of the results. We give a brief description of the procedures and methods used in the project as well as an overview of the initial results.

Coarse ware – Imperial period – *Noricum* – Roman pottery – typology

Project

The Roman city of *Flavia Solva* was located on the western bank of the Mur River, in the province of *Noricum*, close to what is today the town of Wagna near Leibnitz in Styria (Austria) (**fig. 1**).

On the site of a settlement populated since Augustan times, the municipium of *Flavia Solva* was founded under Emperor Vespasian (a different research approach: Groh 2021).

Large parts of the city have been excavated by the Universalmuseum Joanneum, starting over 140 years ago.

The first work was conducted by Friedrich Pichler in 1877. The main part of the city map is based on the excavations carried out under the direction of Walter Schmid from 1911 to 1918. Between 1950 and 1970, Walter Modrijan and his team focused mainly on areas where research and documentation were necessary due to upcoming construction projects. In contrast, the activities of Erich Hudeczek over the following 32 years and those of Barbara Porod from 2007 to 2011, concentrated on research questions and the study of insulae in the center of *Flavia Solva*. Between 2001 and 2004, three emergency excavations were also carried out by the Federal Monuments Authority Austria.

The more than 140 years of excavation work has resulted not only in a large amount of mainly analog documentation such as hand-drawn plans and diaries, but also an enormous mass of finds.

So far, publications concerning the excavations and the find material have been limited to those dealing with specific districts of the city. These relate to Insula XLI (Groh 1996; Hinker 2014) in the northwest of the settlement, Insula XXIII (Rabitsch 2013) in the east, Insula XLIII (Seehauser 2007) in the southeast, and finally a dissertation on the findings



Fig. 1. Position of *Flavia Solva*
(archive / Universalmuseum Joanneum).

and finds before the foundation of the *municipium* under the later Insula XL (Hinker 2006) in the northeast. **Fig. 2** shows all archaeological excavations in the city area (Karl 2008).

In addition, an extensive publication has recently been published on *Flavia Solva*, based on the results of geophysical surveys (Groh 2021).

Since February 1, 2021, the previously unexamined find material from the above-mentioned excavations has been prepared and archived in a standardized form as part of the “Examining the finds from *Flavia Solva*” project. This project is funded by the Provincial Government of Styria and the Federal Monuments Authority Austria and runs until December 31, 2025. The research facility in charge of the

Fig. 2. Map of *Flavia Solva* (Karl 2008).

project, which is led by Dr. Barbara Porod, is the Department of Archaeology & the Coin Cabinet of the Universalmuseum Joanneum. Up to five employees are responsible for examining selected glass finds (by Mag. Gudrun Glöckner), coarse ware (by Mag. Dr. Johanna Kraschitzer, Mag. Dr. Gudrun Praher-Malderle), local and imported fine ware (by Dr. Silvia Radbauer), mural paintings, and Walter Schmid's excavation documentation (by Dr. Ortwin Hesch).

The aim of the project is to fully classify and digitally archive the finds in the “imdas pro” database, completely digitize the historical documentation, and to carry out a selective, concise scientific examination followed by the subsequent publication of the results.

The authors of this paper are responsible for the archiving and the scientific analysis of the coarse ware. This part of the project should largely be completed by March 2023. A brief description of the procedures and methods used in the project is given below.

Methods

The unexamined finds from *Flavia Solva* are stored in 2.350 boxes in the central depot of the Universalmuseum Joanneum. About 1.350 of these boxes contain coarse ware. We use this term to describe vessels that were used as tableware, as well as for cooking and storage.

In the first phase of the project, the coarse ware from excavations from different areas within *Flavia Solva* was studied and analyzed. This helped us to gain an overview of the common shapes and vessel types used in the city. After this, the main focus was on the material from more recent and stratified excavations.

One of these, in the area known as “Hochweg”, was carried out in 2003 and 2004. It is located in the south-eastern part of the settlement and intersects four insulae and three roads. It is important because it is the largest sector of *Flavia Solva* that has been excavated in one go and documented consistently.

Before the start of the project, it was planned to examine the entire coarse ware. This quickly turned out to be impossible due to the sheer number of sherds. As a result, it was decided that only the stratified finds from “Hochweg” would be examined and archived digitally as a whole.

This necessary decision was made under the premise that, concerning the domestic pottery, above a certain volume of examined material, no noteworthy new findings could be expected.

Only diagnostic sherds are archived in the database. In our case, these are rim and base fragments as well as decorated wall sherds and functional elements such as handles, spouts, and feet.

First, the fabric of each piece is identified; in the case of the coarse ware, this depends not only on the type of tempering



Fig. 3. Different fabrics of coarse ware from *Flavia Solva* (Johanna Kraschitzer/ Universalmuseum Joanneum).

and the firing atmosphere (reducing/oxidizing), but also the size and quantity of the particles added to the clay. The piece is classified using macroscopic observation and with the aid of a magnifying glass. The sherd types defined in this way are examined mineralogically for further analysis in order to obtain information about both the quality of the clay and the type of tempering components (fig. 3).

Regarding the shape of the vessels, a distinction is made between the established tall and wide forms. The contours of the rims were systematized in order to be able to identify them without ambiguity. For this purpose, drawings were made of the first 1.294 diagnostic pieces examined. They come from find units from excavations carried out from the 1970s to 1990s, which were selected more or less at random.

The drawings were made using a laser aided profiler (LAP). This device does not scan surfaces, but cross-sections and diameters. Based on this data, the software generates two-dimensional illustrations, as they have been used in ceramics research for decades. The images are saved as vector graphics, which can be further processed as needed. If necessary, the LAP can also take photos to depict three-dimensional and painted decorations. It is thus possible to keep the amount of data generated to a minimum while still having all the visual information required for formal comparisons (fig. 4).

Within the vessel shapes as superior hierarchy elements (e.g., pot, plate, or tripod vessel), the types of the rims differ in terms of formal criteria. These are primarily determined based on the formation of the rim—according to the inclination and the shape of the lip—as well as the shape of the neck zone. In addition to formal characteristics, consideration is also given to aspects with chronological significance, such as the use of specific tempering particles or technical criteria.

Stylistic criteria such as decor or surface treatment can be taken into account where they occur regularly and are also decisive for the creation of a group in these cases.

In terms of functionality, the surface treatment – for example, in the form of pitch coatings or slip – can be used to help distinguish between the specific vessel shapes.

Signs of use, such as secondary burn marks or soot deposits, serve as additional criteria that can help identify individual shapes as cooking vessels.

For coarse ware vessels tempered with fine particles, the only manufacturing technique that can be observed is the fast potter's wheel. In the case of the coarsely tempered pieces, the systematization makes no distinction between wheel-thrown pottery and those formed by hand and using the slow wheel. In terms of the larger pots and the dolia, however, craftsmanship by hand cannot only be assumed but also regularly observed.

As is often the case with pottery from settlements, the material base consists of relatively small fragments. Due to the state of preservation of the sherds, a classification which takes into account all features of the shape, manufacturing technique, and decoration is not possible. The main focus is thus on the shape of the rim, the fabric, the surface treatment, and the function. Based on this, analogies with already known shapes of vessels in the city itself as well as regional¹ and supra-regional² sites can be used to draw conclusions about the complete forms.

¹ *Vici* (Gleisdorf: Artner 1988/89; Jeschek 2000; Schneeberger 2016; Kalsdorf: Brunnhuber 2009; Pammer-Hudeczek 2009; Saaz: Sedlmayer and Tiefengraber 2006), *Villae* (e.g. Retznei: Schrettle and Tsironi 2020; Rannersdorf: Schrettle and Tsironi 2007; Gröden: Lamm 2011), settlements (e.g. Frauenberg bei Leibnitz: Groh and Sedlmayer 2005; Schrettle 2019; Kugelstein, Riegersburg: Bauer 1997; Schönberg: Oberhofer 2012) and burial grounds (Fuchs 1980) in the Territory of Flavia Solva.

² E.g. *Poetovio* (Isternič 1999, 2000; Janežič 2018), *Celeia* (Krajšek 2015; Krajšek and Žerjal 2022), *Carnuntum* (Petznek 1997, 1998), *Virunum* (Zabehlicky-Scheffenecker 1997, Zabehlicky-Scheffenecker and Gostenčnik 2003).

The edge profiles are classified into relatively few main groups using the above criteria. Within these main groups, the most diverse versions of some rim shapes are defined by subgroups. The main groups (tall and wide forms as well as the lids and bases) are identified by a letter, and variants and subvariants by a numerical code. The custom-made input

screen of the “imdas pro” database, with optimized dropdown menus, was tailored to the needs of the project.

Systematizing the vessel shapes made it easy and efficient to input them into the database and rendered it unnecessary to graphically document already known forms (fig. 5).

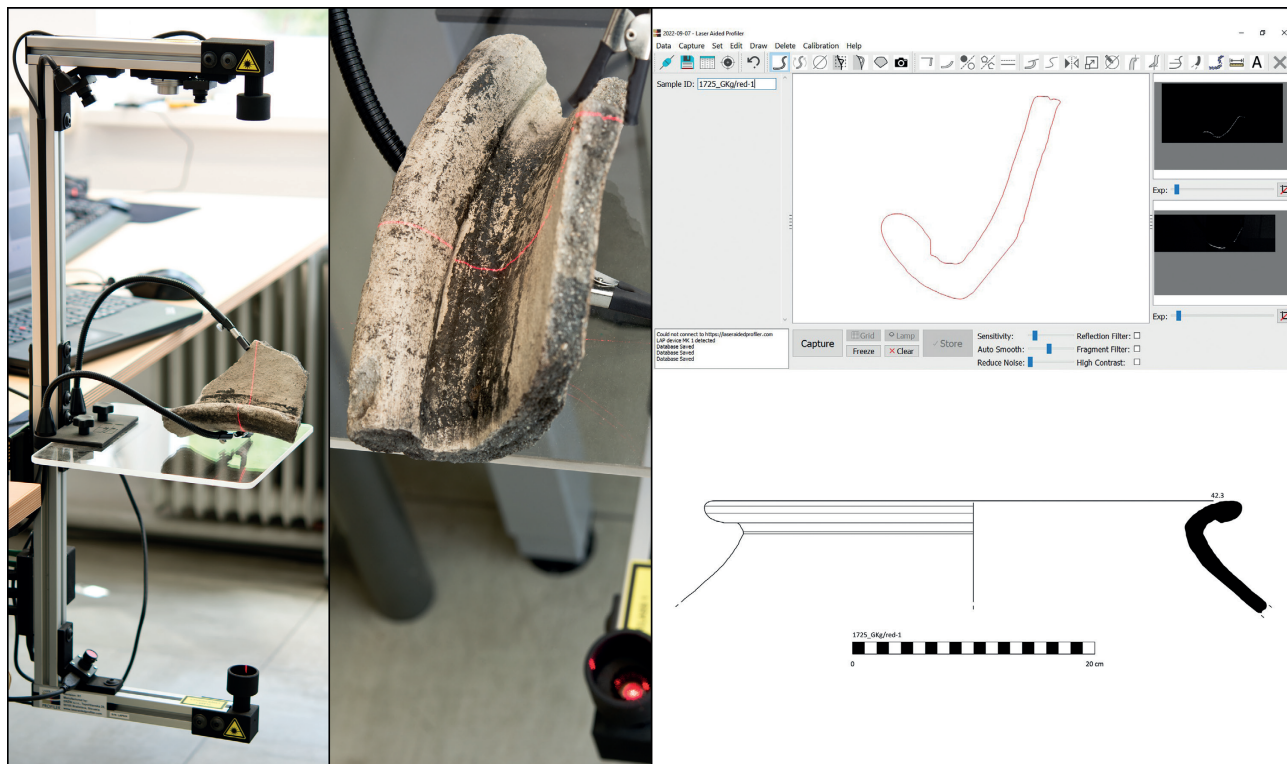


Fig. 4. Laser aided profiler (LAP) (Johanna Kraschitzer/ Universalmuseum Joanneum).

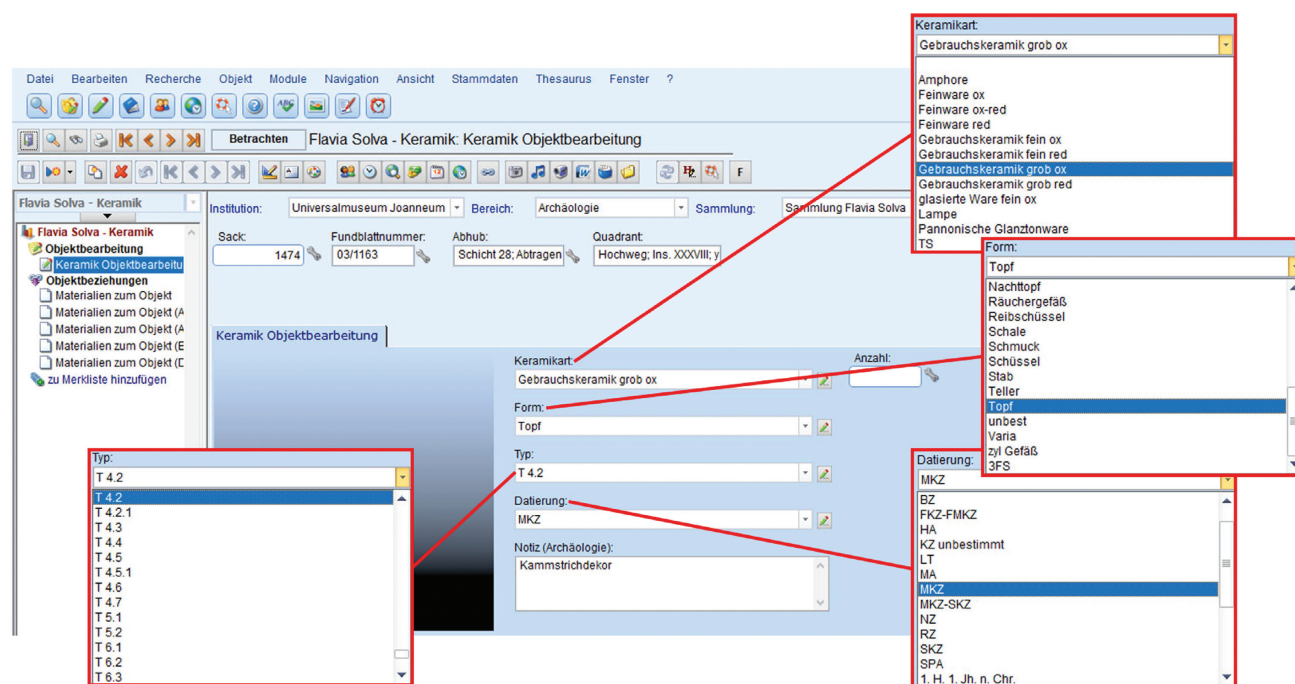


Fig. 5. “Imdas pro” database (Johanna Kraschitzer/ Universalmuseum Joanneum).

This grouping of the edge profiles of the pots is shown as an example (**fig. 6**). The profiles with a black filling indicate that those fragments are coarse tempered. The colored pieces (T 12–T 16) are those with fine particles. Here the firing method is also shown (red = oxidizing atmosphere, light gray = reducing atmosphere). Due to the wide range of subgroups, it is possible to assign even small fragmented pieces to a group more easily and efficiently, which ultimately helps to attain better evaluative statistics.

In addition to the coarse ware, the input screen of the database also offers the option to distinguish between imported fine ware, terra sigillata, and specific shapes such as amphorae and lamps. Sometimes, these pottery types had already been separated during the excavation, but often all sherds of a stratigraphic unit are stored together. If this is the case, the different types of ceramics must be separated from one another, and descriptive data sets must be created. The analysis of the fine ware and the terra sigillata is carried out separately.

Aim and initial results

So far, around 19,200 fragments have been archived in the database. Approximately 90 main groups have been created and 223 subgroups, with the dating ranging from the early imperial period to late antiquity.

Our aim is to create an overview of the pottery available in *Flavia Solva*, based on the finds examined and the evaluable results in the database. In addition, a chronological framework will be created in which the shapes occurring in *Flavia Solva* can be classified and in which—ideally—an evolution of individual formal types can be recorded. The sheer number of finds examined and catalogued provides a reliable basis for the discussion of the regionally occurring and supra-regionally traded ceramics. In this way, specific regional characteristics, as well as their influences and their developments, should become more apparent. Vessels from the extensive cemeteries around the city, which have already been examined and published on, can be used as support. This research will make an important contribution to the study of Roman pottery in the province of *Noricum*. It also aims to emphasize the fact that *Flavia Solva* was off the main trade routes and that traditional shapes were therefore able to adapt slowly and more independently to changes in society and habits.

The following provides an overview of the initial results from the material archived in the database so far (**fig. 7–9**).

Fig. 7 shows a selection of the most common shapes of vessels, which can be dated to the early imperial or early middle imperial period.

These are, for example, coarsely tempered cups with a slender body and an S-shaped, vertical lip (Be 2.1); coarsely tempered pots with a spool-shaped, thickened, outwards bent lip (T 4.1); with a narrow, triangular, thickened lip (T 6.3, T 6.4); or those with an only slightly thickened lip pointing inwards and a barrel-shaped body (T 17).

This period also corresponds to finely tempered pots with an S-shaped, vertical lip (T 14), or those with a thickened lip

pointing inwards and flattened at the top, sometimes grooved on the outside (T 16.2, T 16.3).

The dolia have a bulging, thickened, strongly retracting edge with a grooved upper side (Do 1.3). Among the coarsely tempered bowls, there are such with a thickened lip that curves inwards (S 3.2). Of the bowls with fine tempering, those with an S-shaped profile and a lip pointing inward (S 10.2) can be distinguished from those with a lip pointing outward (S 11.3). In addition, there are bowls with an outwards curved lip (known in German as *Lippenrandschüssel*, S 14.1).

Of the tripod vessels, only those with a lip pointing inwards and horizontal grooves on the body belong to this period (DrS 1.1.1.1, DrS 1.4, and DrS 1.5). In the case of jugs, there are those with a short sloping rim (K 4.3) and those with a slightly thickened lip and a cord on the neck (K 5). Lids with a folded edge also belong here (D 3.2). For the sake of completeness, plates with inwards curved rims are also shown (Te 1.1), though this shape continues without major changes into later periods.

In the group of finely tempered bowls based on Sigillata shapes, it is possible to distinguish imported forms, for example from Poetovio (Istanič 1999: 93, fig. 79 PTS/ITS 3, PTS/ITS 4) from pieces from local/regional production in group S 10.2, S 11.3, or S 14.1. This is shown by comparative examples from different sites (Artner 2005: 299, Taf. 3/17–24; Fuchs 1980: Taf. A 50: 3102; Jeschek 2000: Taf. 67; Schrettle and Tsironi 2020: 121 Abb. 114 Form 3). The T 16 pots (Istanič 1999: 132, fig. 124 LF/JrF 4. LF/JrF varia) and the DrS 1.4 tripod vessel may also be imports.

Local forms can be identified in the roughly tempered beakers (Fuchs 1980: Taf. A 49: 2403a+b) and pots (Artner 1999: Taf. 19/248. 257, 50/633, 62/770; Groh and Sedlmayer 2005: Taf. 14/329/10; Heymans 2008: 192 Taf. 9/37–3; Hinker 2006: 165 Taf. 24, 169 Taf. 28/194, 170 Taf. 29/197; Schrettle 2019: 392 Taf. 15/6), the tripod vessel DrS 1.5 (Artner 1988/89: Taf. 20/15; Jeschek 2000: Taf. 103), the dolia of typical latenoid shape (Artner 1999: Taf. 49/614; Schrettle 2019: 393 Taf. 16/1) and the folded lid (Artner 1999: Taf. 34/440; Groh and Sedlmayer 2004: 472 Taf. 1/4/1; Hinker 2006: 175 Taf. 34/235–241; Schrettle 2019: 381 Taf. 4/1; Schrettle and Tsironi 2020: Taf. 93/16) occurring from the second half of the 1st century B.C.

In the middle and late imperial period we find the groups of vessels shown in **fig. 8**.

A development of different shapes can be seen, for example, the finely tempered bowls S 10.4, S 10.5, and S 10.6, as well as S 11.4 and S 11.5, which are vessels of local or regional production (Jeschek 2000: Taf. 69–71; Lamm 2001: 363, Taf. 11/2002/B6/2; Schrettle and Tsironi 2020: 130, Abb. 119 Schüsseln Form D). In contrast, we assume that some of the vessels that were assigned to the group of bowls S 11.2, S 12.2, or S 14.2 were not produced in the greater municipal area.

In the case of the bowls, we need to differentiate between imported vessels and those from local production. We hope to verify not only formal differences, but also the distinction between regionally and supra-regionally produced pieces in the group of bowls through targeted sampling for

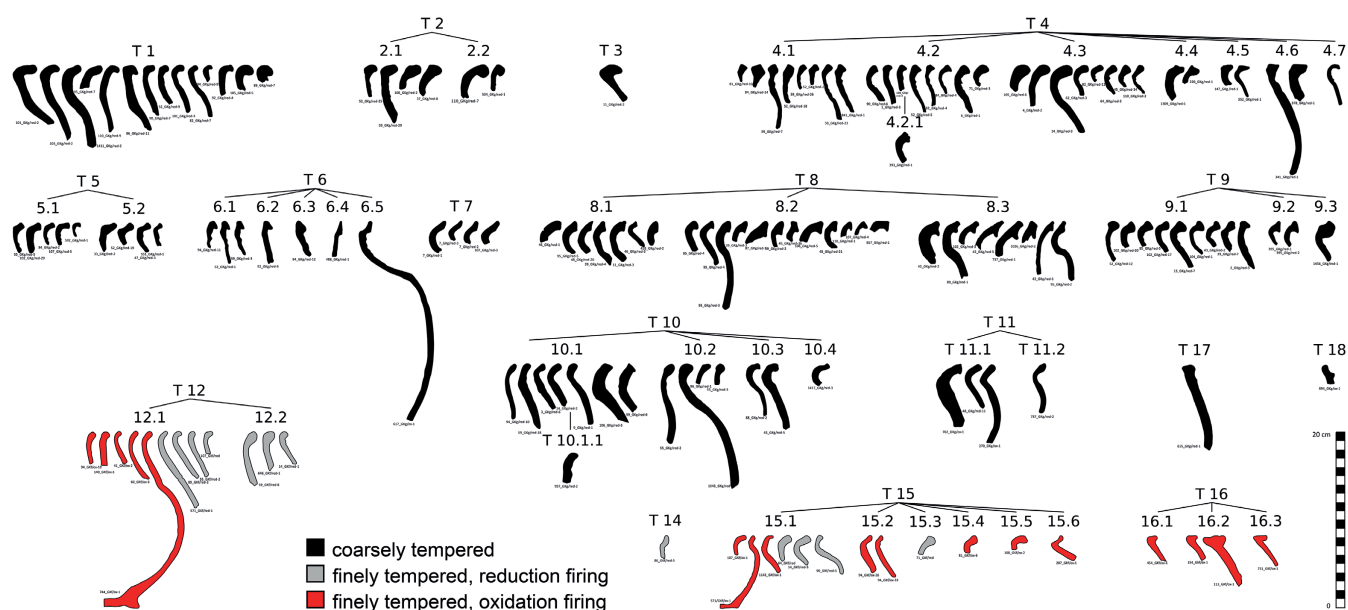


Fig. 6. Grouping of the edge profiles of the pots (Johanna Kraschitzer/ Universalmuseum Joanneum).

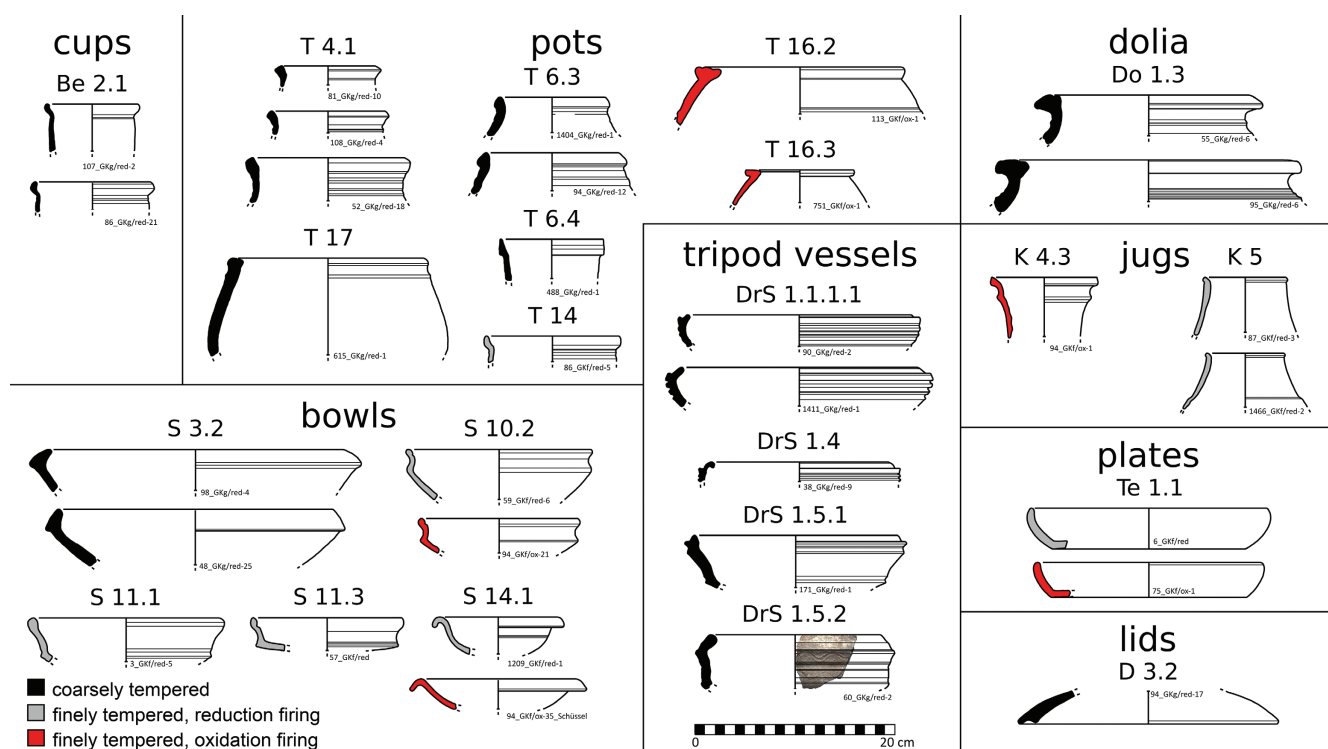


Fig. 7. Groups of vessels from the early imperial or early middle imperial period (Johanna Kraschitzer/ Universalmuseum Joanneum).

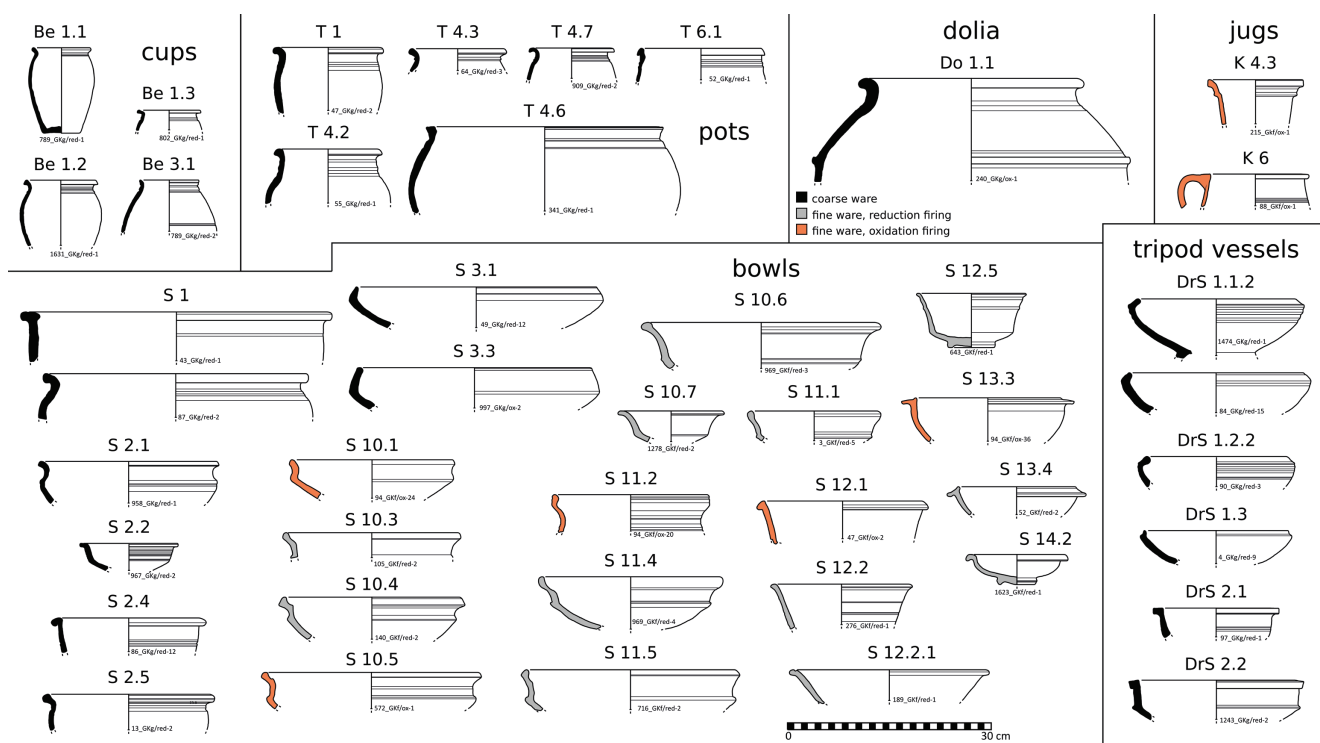


Fig. 8. Groups of vessels from the middle and late imperial period
(Johanna Kraschitzer/ Universalmuseum Joanneum).

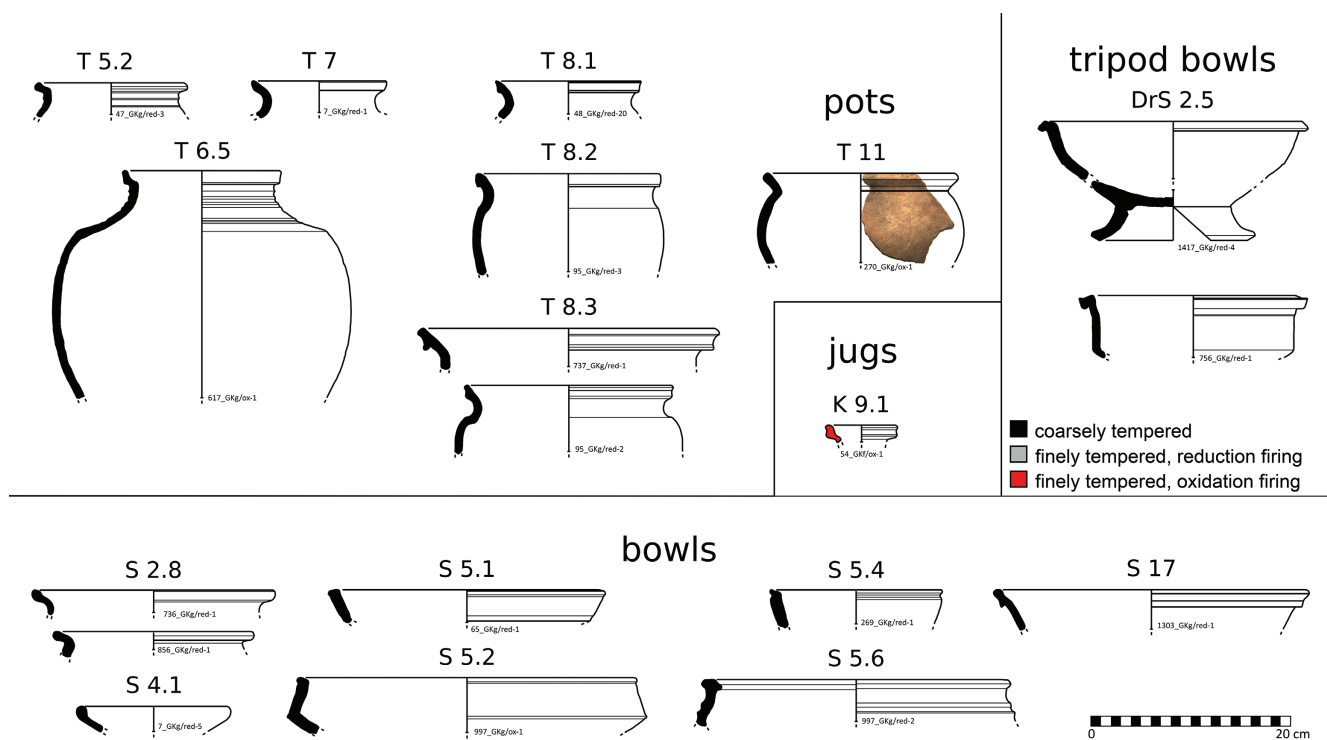


Fig. 9. Groups of vessels from the late imperial period and late antiquity
(Johanna Kraschitzer/ Universalmuseum Joanneum).

mineralogical testing³ of pieces from Poetovio.

A more precise chronological order of the coarse ware will be possible once the results of the evaluation of the fine ware are available. At this point it will also be possible to establish the sequence of dominance of individual vessel types.

Finally, we show shapes occurring in the late imperial period and late antiquity (**fig. 9**). The rims of the pots tend to be narrower (T 7) or triangular (T 8) in shape, with the grooved rim (T 8.3) also being typical. The group of tripod vessels is characterized by outwardly folded, partly overhanging lips and indentations on the top (DrS 2.5). The bowls with coarse tempering show a great variety of shapes. From the late imperial period onwards, carbonate was added to many of the vessels. This tempering method is thus also a chronological criterion.

Looking ahead

We still do not have satisfactory answers to each and every research question, but this is also due to the fact that we have

yet to complete our examination of the pottery from Flavia Solva. It is already clear, however, that we not only have a reliable basis for the discussion of the coarse ware used and produced in the city, but we can also provide material for further research. A study of the Norian-Pannonian tripod vessel would, for example, be highly desirable. This shape probably developed in the wider area and is very dominant not only in the city but the whole region. In addition, the dolium with the shoulder ledge comes to mind, which is also a variant that is typical for the area around Solva. Here, too, settlements in the vicinity should be included in the research, and information on dietary habits, storage, and trade can be expected.

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