

Erika Cappelletto & Hallvard Indgjerd

NEW ACQUISITIONS FROM THE HELLENISTIC-ROMAN-BYZANTINE EAST NECROPOLIS OF *HIERAPOLIS* IN PHRYGIA: THE *UNGUENTARIA*

Since 2007 the University of Oslo has conducted investigations in the East Necropolis of *Hierapolis* (Hierapolis Necropolis Est-HNE in the context of the Thanatos project) in collaboration with the Italian archaeological mission, MAIER. The project encompasses not only the excavations of interesting areas but also a geographical survey as exhaustive recording of the structures in this area is lacking¹. The excavations have uncovered a wide range of objects in ceramic, glass and metal.

The analysis of the pottery objects and the questions concerning the division between grave goods and intrusive objects and other in-perspective issues will be presented in full as part of a publication in the *Hierapolis di Frigia*-series, devoted to the excavations of the University of Oslo.

The aim of this paper is to consider the presence of *unguentaria* in the burial contexts. With this contribution we hope to open a new and constructive revision and discussion of this kind of pottery.

Introduction: the typochronology and function of *unguentaria*

Unguentaria are small flasks, in glass or terracotta, usually ranging in height from 5 to 20–30 cm. Hübner very clearly states that “the morphology of the ancient vessels repertory reveals, above and beyond regional and period preferences for ornamental design, a stringent, semantically linked logic of form”². The precise purpose and the contents of these vessels however is still uncertain.

The Latin term *unguentarium* is a modern construct, based on archaeologists’ interpretations of the vessels as ointment containers but this use is not based on the discovering of a particular vessel type utilized in this way. Moreover we do not have direct reference in the literature of the use and function of these vessels.

It has been suggested that they served to transport perfumes throughout the Mediterranean and that the production was connected to a small number of workshops, close to the centres of the perfume industry. Even if this assumption

cannot be ruled out, it does not seem very plausible due to the variety of fabrics and shapes encountered at various sites³.

Because of the closed shape and narrow mouth, Anderson-Stojanović argues that they could better contain liquids such as wine or water or thick substances such as oil or honey, rather than solid perfume or unguent for which it would have been necessary to use a long spoon or to break the neck⁴. The majority of *unguentaria* have a porous clay fabric and unslipped internal surfaces, making them less suitable to retain liquids for a long time. Hübner assumes that *unguentaria* glazed inside had different contents from those with a porous clay interior⁵.

While *unguentaria* are not infrequently found in public and household assemblages, they are primarily connected to funerary contexts. The vessel type is thought to have taken over the role of the 6th century BC *aryballoi*, and the 5th–4th century BC *miniature lekythoi* as oil and perfume containers and as grave offerings, or to represent part of the libations during the ceremonies and rituals⁶.

Residue analyses carried out on *unguentaria* show that they have contained various substances, including cosmetics, food and oils⁷. Other hypotheses comprise vinegar, *garum*, spices, honey, and medicaments. Mortensen sees a standardisation of contents, based on resinous substances, particularly pine oil, but also myrrh and spikenard⁸. Her study shows this consistency to be true across shape and material differences, and she points to the possibility of a certain odour as being associated with funeral rites across the Roman Empire⁹.

Anderson-Stojanović, based on her study of the *unguentaria* from Stobi and the previously published finds from the Athenian Agora, Corinth, Argos and Sardis, identified two basic shapes: spindle-shaped or fusiform and pear-shaped or bulbous (or piriform). Camilli benefitted from this first classification and he increased the types to three: Group 1/ *lekythoi*, group 2/fusiforms and group 3/piriforms¹⁰.

³ LAFLI 2003, 28.

⁴ ANDERSON-STOJANOVIĆ 1987, 115.

⁵ HÜBNER 2006, 33.

⁶ ANDERSON-STOJANOVIĆ 1987, 122.

⁷ HÜBNER 2006, 34–35; PÉREZ-ARANTEGUI/PAZ-PERALTA/ORTIZ-PALOMAR 1996; RIBECCHINI ET AL. 2008; MORTENSEN 2014.

⁸ MORTENSEN 2014, 82.

⁹ Ibid. 80–83.

¹⁰ A. CAMILLI, *Ampullae, Balsamari ceramici di età ellenistica e romana* (Rome 1999).

¹ S. AHRENS/R. BRANDT, Excavations on the North-East Necropolis of Hierapolis 2007–2010. In: F. D’Andria/M. P. Caggia/T. Ismaelli (eds.), *Hierapolis di Frigia. Le attività delle campagne di scavo e restauro 2007–2011* (Istanbul forthcoming).

² HÜBNER 2006 27.

In the last third of the 4th century BC the early version of *unguentarium* occurs in at least three varieties and they seem to substitute the *lekythos*, even if both forms can be found in tombs along with *alabastra*. The early versions are similar to a miniature belly amphora with a small foot and with or without pseudohandles attached. The successors develop from a distaff-shaped flask into a stretched spindle-form. Up to the 3rd century they change only a little, while from the mid-2nd century the appearance becomes repetitive: there is a tendency to decrease the amount of interior space by making them slender and the foot solid rather than hollow with the result that they turn out to be very unstable to stand upright on their own.¹¹

During the 1st century BC the bulbous *unguentarium* becomes popular and it remains in use till the later 1st century AD. This change is documented in Argos, Corinth and Stobi where the two types are found together in tombs dated to the second half of the 1st century BC. The transformation is seen in connection with the introduction of glass-blowing in the mid-1st century BC. With glass vessels being cheaper and more readily available, glass *unguentaria* soon occur in burial contexts, and bulbous clay imitations of the glass shapes take over from the fusiform one. During the 1st century AD, however, glass *unguentaria* start to dominate completely, pushing their clay counterparts off the market¹². The two types are however seen to coexist in some areas during the 2nd and 3rd centuries AD, e. g. in Thrace and on Cyprus¹³.

Even if the so called late Roman *unguentaria*¹⁴, first mentioned by Hayes who identified them as a separate vessel type from late imperial to Byzantine times in the Eastern Mediterranean¹⁵, do not really belong to the previous *unguentaria*, it is worth to mention them because we found one example in our excavation.

The new form has a slender neck, a ridge around the base of the neck marks the transition to the body that is elongated with fusiform profile. The walls are thick and the vessel ends with a solid, pointed base. Hayes considered as production centre the Palestine-Lebanon area since the vessels have a clear resemblance to earlier Nabataean ceramics, at least for fabric and colouring, and his assumption was that they contained holy oil or water¹⁶. It has been suggested that three stamped *unguentaria* found at Rhodes were used as “pilgrim flasks to carry oil from the *martyria* of saints or waters from the river Jordan”¹⁷. But it still remains unclear what they contained: the tests made did not prove anything.¹⁸

Considering the amount of *unguentaria* found in Constantinople¹⁹, possible production centres are assumed near or in Asia Minor: at *Limyra*, *Perge*, *Ephesos*, *Sagalassos*,

Armorium, *Laodikeia*, *Hierapolis*²⁰ and at *Kibyra*²¹. Their products were distributed between the 5th and beginning of the 8th century, but the main output was between the 6th and the 7th century AD. The excavations in Constantinople indicate that they did not appear before the 5th century AD and they continued to be used till the 7th century: this assumption is confirmed by the discoveries in other parts of Asia Minor. Typical is the application of a reddish-brown slip along the rim which sometimes runs down to the base. Another feature is the presence of stamps just above the base²². These are small, either rectangular or circular in shape and the majority are epigraphic with personal names but sometimes there are only figures as in *Hierapolis* or *Laodikeia*²³. The names might signify potters or even producers.

Most of these *unguentaria* in Asia Minor were found in religious contexts or in domestic buildings²⁴. In contrast to the earlier types, they are more common in settlements implying that such *unguentaria* were not made simply as grave goods or containers for offerings.

The HNE excavations

The main part of the recent excavations in the East Necropolis of *Hierapolis*²⁵ concentrated around a group of Roman grave monuments consisting of three saddle-roofed “house tombs” and four sarcophagi. The house tombs are dated to the 1st century AD and are inscribed with the names of the assumed first owners: Patroklos, Eutyches and Attalos. The sarcophagi were probably added slightly later; the two immediately in front of Eutyches’ tomb bear the names of Ariste, daughter of Eutyches, and Apollonios, son of Eutyches, respectively. While the excavations inside the house tombs revealed artefacts and osteological remains of multiple burials in each, the finds in the sarcophagi were more scarce, indicating that they had been emptied or robbed. Also the area between the graves was excavated, and a significant amount of coarse ware pottery, fragments of lamps, *unguentaria* and mould-made bowls were found. All contexts were disturbed, either by later intrusions or by other post-depositional processes; joining pottery sherds were found not only in separate stratigraphical layers of the same tomb, but also across contexts inside and outside the tombs and sarcophagi. Still, we believe that complete or well-preserved vessels, of which the majority of the sherds was found in one tomb context, can be seen as originating from that tomb and that this is a sound basis for analysing the finds.

¹¹ It is not odd to find different varieties of the fusiform *unguentarium* in the same place; ANDERSON-STOJANOVIĆ 1987, 108–109.

¹² ANDERSON-STOJANOVIĆ 1987, 113.

¹³ Ibid.

¹⁴ cf. LOCHNER ET AL. 2005, 647.

¹⁵ HAYES 1971.

¹⁶ Ibid. 244; 246. Thus few vessels were found.

¹⁷ D. PAPANIKOKA-BAKIRTZI (ed.), *Everyday life in Byzantium* (Athens 2002) 175.

¹⁸ In *Laodikeia* the residues indicate an organic compound; ŞİMŞEK/DUMAN 2007, 296.

¹⁹ HAYES 1992, 8–9.

²⁰ Ibid.; ATİK 1995; METAXAS 2005; DEGEEST ET AL. 1999; LAFLI 2012; ŞİMŞEK/DUMAN 2007; COTTICA 1998; id. 2000.

²¹ S. JAPP, The local pottery production of Kibyra. *Anatolian Stud.* 59, 2009, 95–128 (with previous bibliography).

²² LAFLI 2003, 35–38.

²³ COTTICA 2000 fig. 2.35, ŞİMŞEK/DUMAN 2007 pl. 16–17; 22.

²⁴ See the list in LAFLI 2012, 188.

²⁵ For short descriptions see BORTHEIM ET AL. 2014; AHRENS ET AL. 2013; SELSVOLD ET AL. 2012; WENN ET AL. 2010.

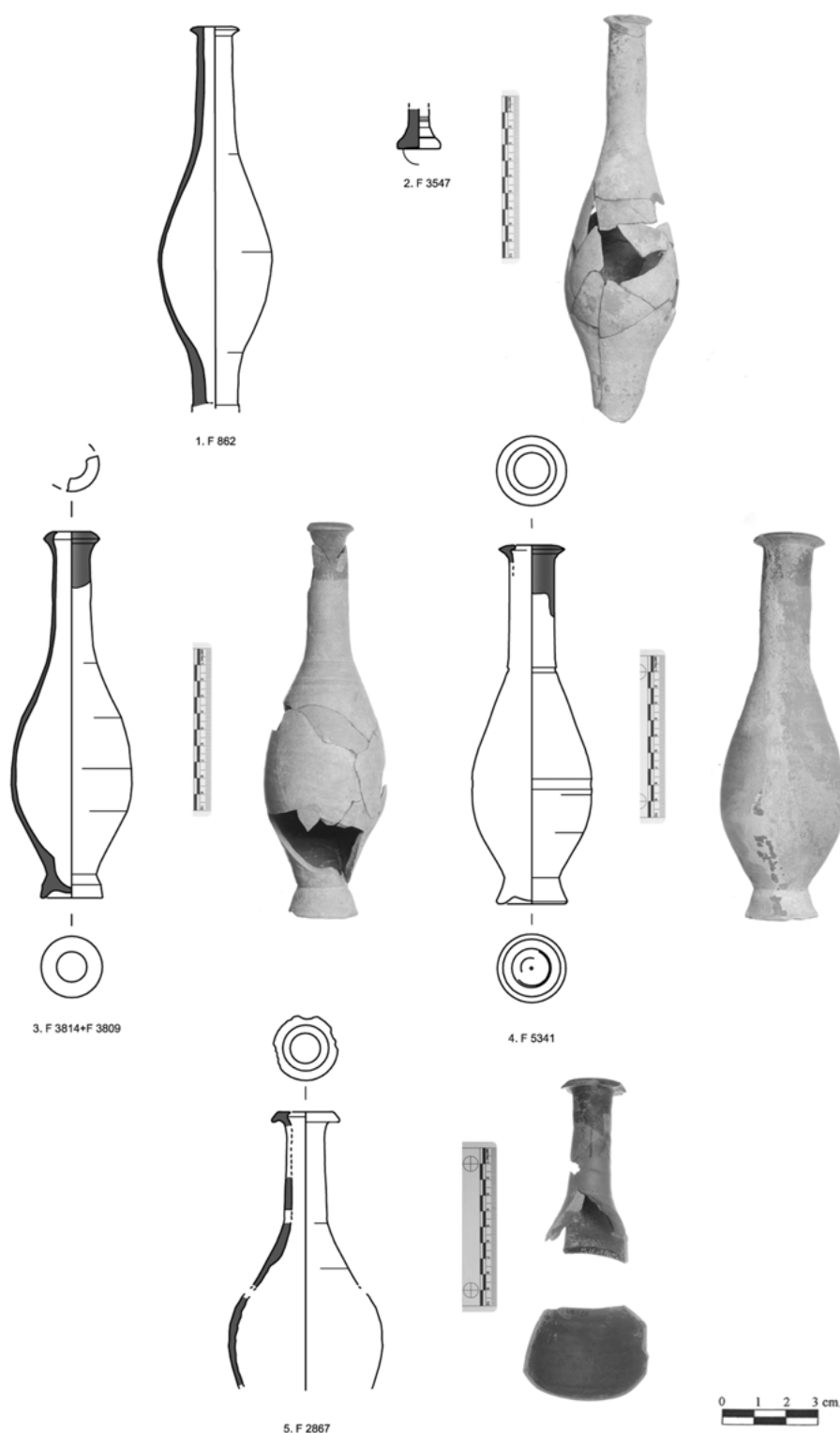


Fig. 1. 1–2 Hellenistic *unguentaria*; 3–5 hybrid *unguentaria*.

Typology of *unguentaria* in *Hierapolis*

Based on the finds from the excavations in the East Necropolis in *Hierapolis*, the situation here seems to be somewhat more complex than the standard account of *unguentarium* development given above.

With a proposed date for the excavated burial complex in the 1st century AD, the presence of two Hellenistic

fusiform *unguentaria* is somewhat surprising. They were found in fragments, however, mainly in the area outside the tombs, and cannot be attributed to any specific tomb: F 862 (fig. 1,1) was unearthed in pieces and then assembled together, it is almost complete, lacking the foot, with a projecting rim and tubular neck; F 3547 (fig. 1,2) is represented by a base with a small distinctive ring foot and cylindrical stem.

Two others (F5341 and F3814-3809), found in Patroklos' tomb, represent a hybrid (or a separate?) form. While the tubular neck and ovoid (or spindle) body could fit both a fusiform and a piriform vessel, the flaring ring foot corresponds to neither. This shape is not known from Laodikeia, but similar shapes in the Izmir Museum have been dated to the end of the 1st century BC.²⁶ (fig. 1,3–4).

Maybe the matching sherds F 2867 (fig. 1,5) could belong to this group, mostly because of the clay and the fabric and not because of form (which resembles the piriform shape).

Interestingly, the piriform type imitating glass is hardly found in the excavated area, although these are common in the few known burial contexts from the North Necropolis²⁷. Still, a few vessels belong to the piriform type: F 4603-4733 from the tomb of Patroklos has a flat base, a bulbous body and a beveled rim (fig. 2,6). F 3058 (fig. 2,7), belonging to the tomb of Eutyches, has a more triangular body and a closer resemblance to the candlestick glass *unguentaria*.

Two other groups, that do not fit the general typology, are present in the Lycos valley material. One group is called “Roman fusiform”, due to its similarity with the Hellenistic shapes. Şimşek et al. might well be right in considering these vessels as imitations of the earlier fusiform ones, but they are still clearly distinguishable from the Hellenistic counterparts in the soft transition between neck, body and base and the lack of a clearly off-set base. In *Laodikeia* they are dated from the second half of the 1st century AD to the first half of the 2nd century AD²⁸. In the excavated tombs we have only discovered bases (F 65, F 66, F 3302; fig. 2,8–11), but while some of them are more rectilinear than the ones in *Laodikeia*, they belong without doubt to the same type.

The *unguentarium* F 4629 from Patroklos' tomb and the base F 3305 are really similar to vessels catalogued as UN.T3j in *Laodikeia*, ranging between a piriform *unguentarium* and an ovoid one (fig. 2,12–13).

The majority of *unguentaria* from the HNE excavations (mainly from the tombs of Patroklos and Eutyches) have been labelled “ovoid” (fig. 3,14–19; 4,20–23). They are identified by a slender ovoid body, which sets them apart from the piriform types. Rim, neck and upper body are in many cases identical to that of the Roman fusiform type, but the lower body is “cut off” creating a flat base. The same type is also found in *Laodikeia* (UNT3k-l and UNT4) where they are dated to the 1st century and the first half of the 2nd century AD. In *Hierapolis*, however, we have a vessel from an early 3rd century context (F 1811, fig. 4,21).

The characteristically downturned rim shapes give the impression of a rounded dome, and, as with the rims of the Roman fusiform type, they might be seen as reminiscent of the Hellenistic dome-mouth *unguentaria*.

From our excavations we have only one example of a late Roman *unguentarium* from the tomb of Attalos. It is a bottom part and it bears a semicircular stamp²⁹ (fig. 4,24). The stamp can be read: K(ύρι)ε Πρα(οίλι)ο((*crux*))υ meaning “*Oh lord! Of Pra(oili)os ((crux))*”. The inscription may be a prayer's

acclaim with the genitive of the abbreviated name. The letters K and E on the left and right side of the *pi* could be read as the diffuse Christian abbreviation K(ύρι)ε. The name, here as hypocorism, is attested two times at Aphrodisias as personal name and patronymic, in a 5th century list related to a Jewish confraternity called “students of the law” and also known as “those who fervently praise God”³⁰.

Comparison with *unguentaria* found in the North Necropolis of *Hierapolis* and in *Laodikeia*

The best available parallels for understanding the material from the East Necropolis are found in the North Necropolis of *Hierapolis* and in the *Laodikeia* excavations. Thus far, only the late Roman *unguentaria* were also found in non-funerary contexts in the city³¹. Although the main focus in the research on the necropoleis of *Hierapolis* has been on architectural documentation, two recently excavated tombs do provide good contexts for comparison.

Tomb 159d, which was found during the 2001 excavation of the Denizli Museum in the North Necropolis, revealed the burial chambers of a Hellenistic tumulus. The chamber had been sealed off and left intact after the earthquake in 60 AD, and contained artefacts and bone material indicating a period of use from the 3rd century BC until the early Roman period.

From the eighteen clay *unguentaria*³², eleven are of the fusiform type, including both decorated and dome-mouthed vessels from the late 3rd and early 2nd century BC. Four (2001/8, 2001/9, 2001/10 and 2001/15) belong to the late Hellenistic *unguentaria* as defined by Tuluk³³ with a smoothly curved profile. Also the “hybrid” type (2011/33) with flaring ring foot is represented (F5341 and F3814-3809).

The last five piriform *unguentaria* (2011/15, 2001/17, 2011/18, 2011/25 and 2011/34) can be dated to the first half or middle of the 1st century AD. They are of the type expected in this period³⁴, but distinctly different from the piriform *unguentaria* of the East Necropolis, especially in rim shape and body profile.

The other excavated tomb context lies in the northern part of the same necropolis and it belongs to a two-storey rectangular, saddle-roofed tomb (tomb 163d). While the upper chamber was badly damaged and empty, the lower one (the *hyposorium*) was found undisturbed. The benches were covered with thin layers of soil and several skeletons and disarticulated bones; beneath them again a layer of soil with bones and three larger jars³⁵.

Twelve piriform *unguentaria* belong to Camilli's type C33 (last quarter of the 1st century BC to the first half of the 1st century AD), but the closer parallels are to be found in *Laodikeia* with UN.T3e and UN.T3g dated to the Augustan

²⁶ TULUK 1999, 135–136.

²⁷ Ibid.

²⁸ ŞİMŞEK ET AL. 2011, 76–78.

²⁹ We have to thank Prof. Guizzi and Dr. Nocita for their help.

³⁰ <http://insaph.kcl.ac.uk/iaph2007/iAph110055.html#edition> line b10 (with further bibliography).

³¹ COTTICA 1998; id. 2000.

³² OKUNAK 2005, 28–38; id. 2013.

³³ TULUK 1999, 133–134.

³⁴ See *Infra*.

³⁵ For more details see LAFOREST ET AL. 2013.

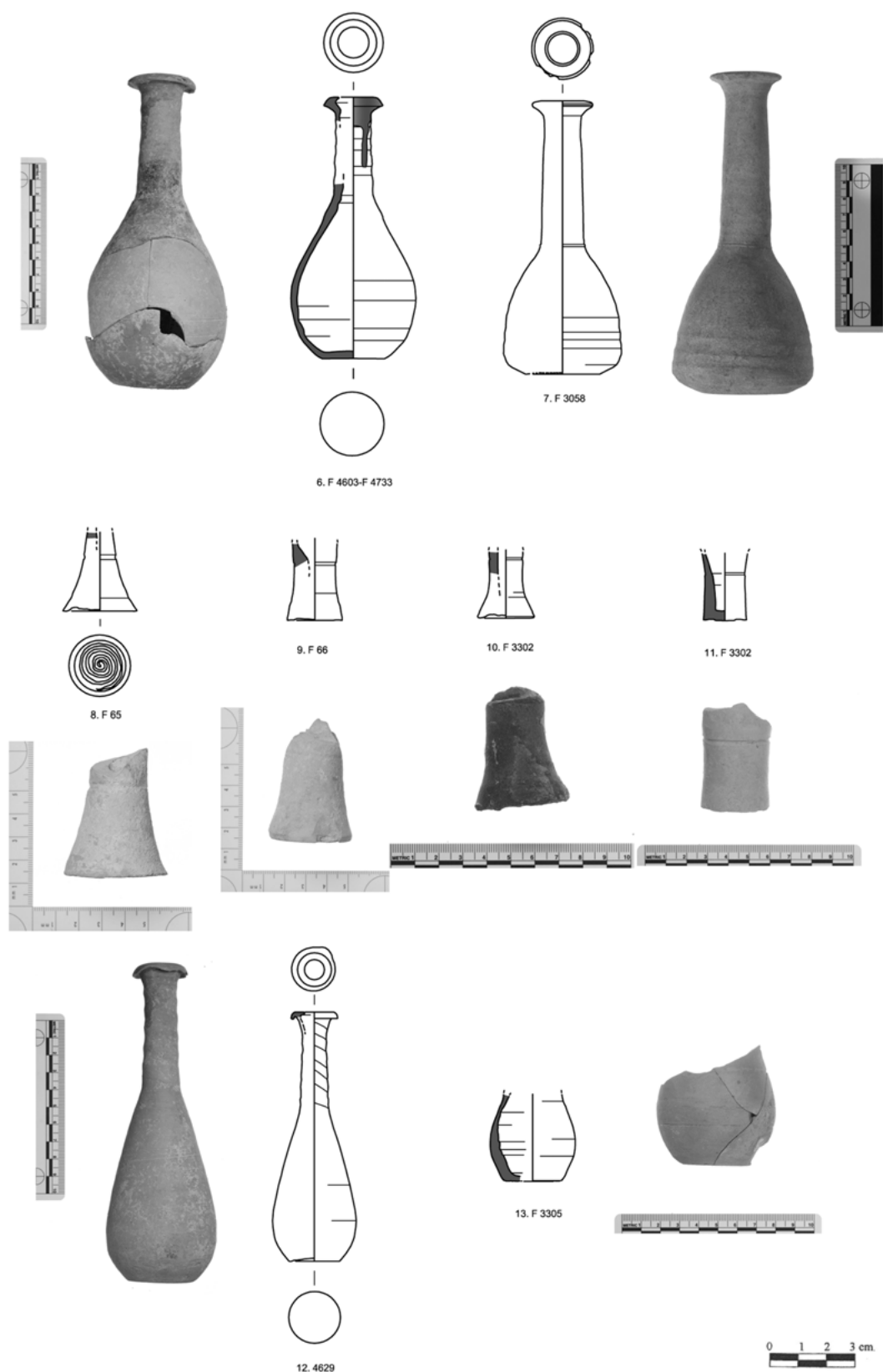


Fig. 2. 6–7 Piriform *unguentaria*; 8–11 Roman fusiform *unguentaria*; 12–13 transitional *unguentaria*.

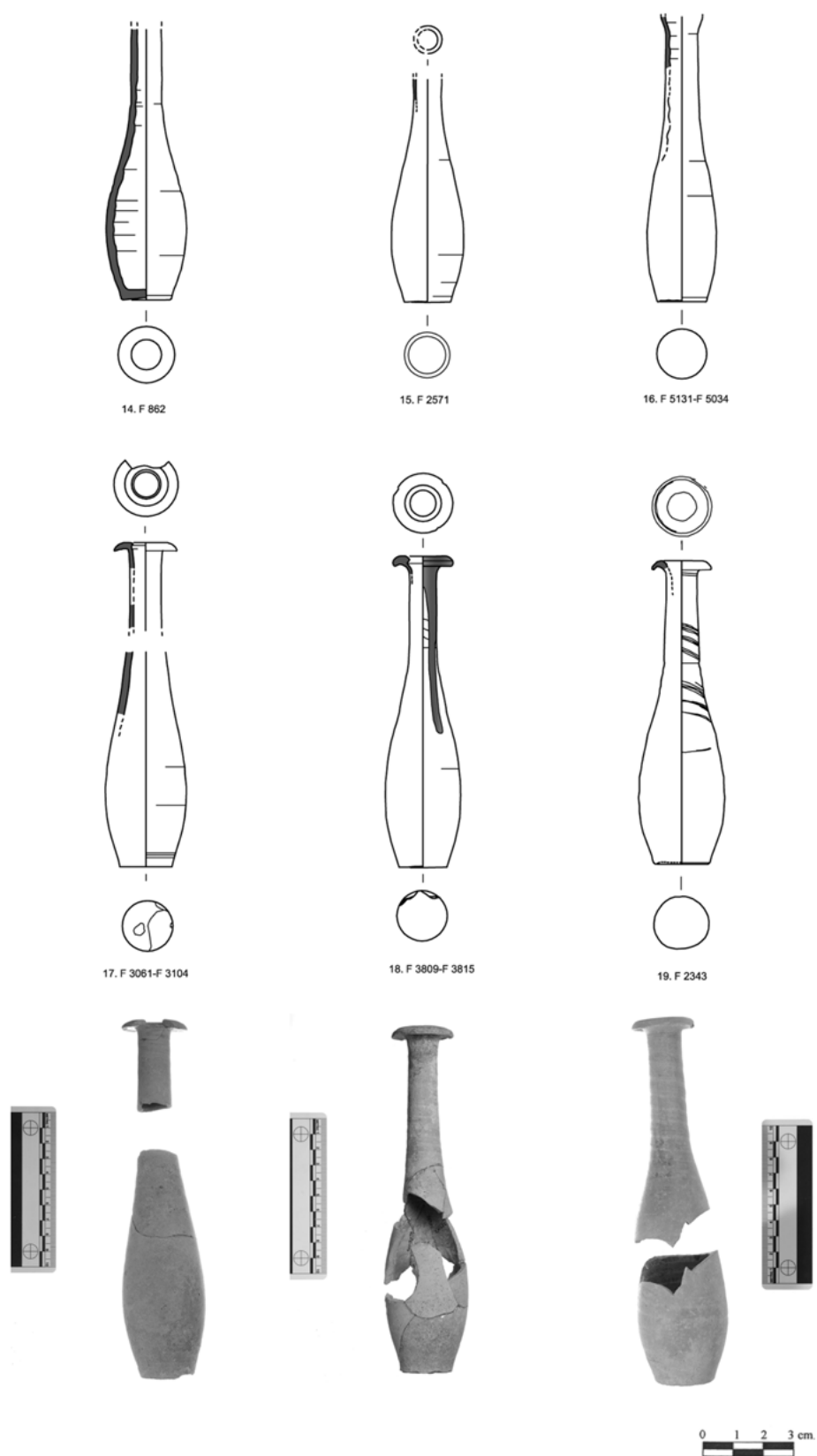


Fig. 3. Ovoid *unguentaria*.

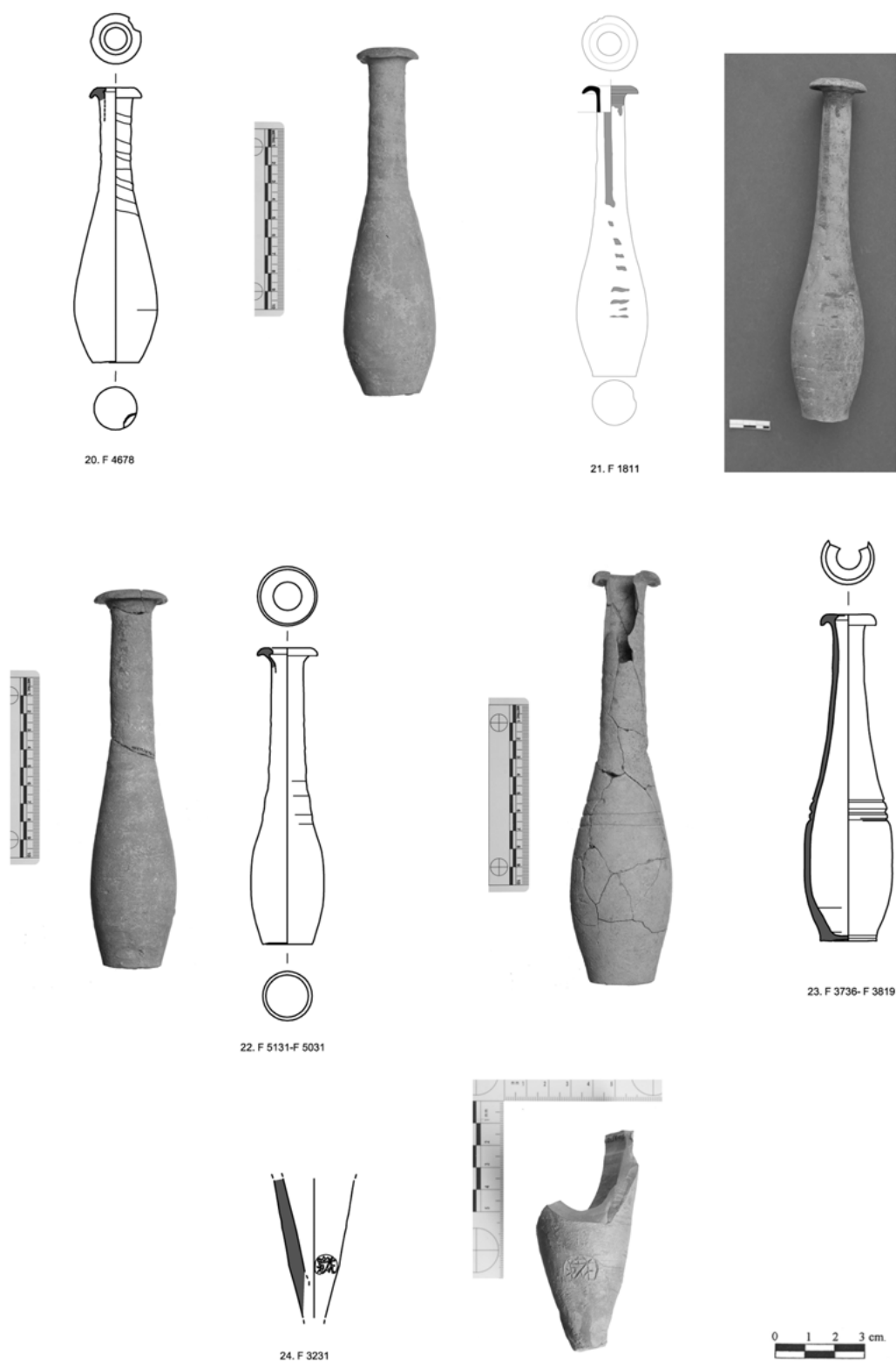


Fig. 4. 20–23 Ovoid *unguentaria*; **24** late Roman *unguentarium*.

era³⁶. Further there are four late fusiform *unguentaria* (the only complete ones so far) as described by Şimşek in the UN.T5-type. While one of these has a nearly conical foot and could belong to the type UN.T5a typical for the Augustan period, the other three are closer to the type UN.T5c dated from the beginning of the 1st to the third quarter of the 2nd century AD. The similarities between the vessels and the small amount of UN.T5a in *Laodikeia*, however, may suggest a long time span also for the first one.

Five *unguentaria*, two of which were complete, belong to the “ovoid” group. Although the body shape varies slightly (cf. *Laodikeia* types UN.T3k-I and UN.T4), they share the typical outturned rim with a rounded, T-shaped lip, as also seen in the East Necropolis.

The excavation in the *Laodikeia* necropolis has revealed a great amount of *unguentaria* and the chronological sequence of the tombs has allowed the excavators to create a chrono-typological table for these vessels³⁷. Due to the fact that the tombs are mostly of the Roman period, Hellenistic *unguentaria* are really rare. As already pointed out the peculiarity of the assemblage resides in the presence of Roman fusiform *unguentaria* (UN. T5) dated from the Augustan period to the second half of the 2nd century AD (UN.T5c) and the ovoid ones (UN.T3K, UNT3I and UN.T4). UN.T4 and UN.T3I are dated from the second half of the 1st century AD to the first half of the 2nd century while UN.T3k already appeared at the beginning of the 1st century.

The evidence in *Hierapolis* and *Laodikeia* allows us to make some suggestions. Even with the relatively small amount of *unguentaria* in *Hierapolis* we can see a great heterogeneity of shapes in the Roman period (1st BC–3rd AD). Although lacking dated contexts in *Laodikeia*, our finds might help adjusting the typochronology of the nearby city by having an absolute *terminus ante quem* of 60 AD for tomb 159d.

The Hellenistic forms are well attested in T159d while absent in T163d. The two occurrences in the HNE excavations do not easily fit into the Roman tomb contexts, but might indicate an earlier use of the area. Also in *Laodikeia* the form seems not to be very widespread due to the fact that the tombs are of the Roman period. The piriform *unguentaria* seem well represented in T159d, T163d and in *Laodikeia* but in the East Necropolis only a few variations of the type have been found. The late fusiform *unguentaria* were found complete in T163d and in fragments in our excavations probably dating to the 1st century AD.

The ovoid form is, so far, the most characteristic shape in the East Necropolis, some vessels are present also in T163d but not in T159d. In *Laodikeia*, Şimşek proposes a date in the first half of the 2nd century AD but F 1811 in T322, dated to the 3rd century AD postpones its usage in *Hierapolis*. Still a 2nd century main period of use is plausible. This form seems not to have a wide area of use and distribution because of its absence in the Cilician and Pisidian catalogue of Laflı³⁸ and in other publications.

The so called hybrid vessels (F 5341/F 3814-3809), instead, have parallels in the imperial Cilician type XXIV and in the Pisidian imperial type XVIII³⁹, and at Izmir⁴⁰.

Conclusion

Our study of *unguentaria* had to be restricted to a single place, a wider overview was not possible because of the inhomogeneity of the material. The only study going in this direction is the PhD thesis by Ergün Laflı on *unguentaria* from Cilicia and Pisidia. This work, however, is based on a museum collection with often poor contextual information. Laflı⁴¹ suggests, anyway, a high level of differentiation between sites and within regions meaning that an uniform “regional” typology, as suggested by Anderson-Stojanović⁴², cannot be possible.

As far as we have seen in *Hierapolis* some types are similar to the ones in *Laodikeia* while others are more common at other places in Asia Minor. The presence of the ovoid *unguentaria* is typical for *Hierapolis* and *Laodikeia*, but we cannot prove if this is also the case at the nearby city of *Tripolis*.

We need to add the “hybrid” *unguentaria* (F5341 and F3814-3809), which could be dated to the Augustan period and not to the end of the 1st century BC, to the typo-chronological table of *Laodikeia* and of maybe the surrounding cities. Perhaps they are a transitional form towards the Roman fusiform *unguentaria* where the flaring ring foot stretches out.

The material discussed shows clear differences in the types located in different tombs, even with supposedly overlapping and parallel periods of use. This either points towards a much more fine typo-chronological development or towards a diversity of preference among the owners. The *unguentaria* in funerary contexts will need further consideration and will need to be included in comparative studies of burial material.

caps0783@gmail.com
hri@st-andrews.ac.uk

³⁶ Cilician imperial types III and IV (last half of the 1st century BC to the early 2nd century AD) and types XIV (till the early 3rd) (LAFLI 2003, 92–93; 95). Tuluk dates comparable vessels to the first half of the 1st century AD (TULUK 1999, 136–139).

³⁷ ŞİMŞEK ET AL. 2011 Tab. 1.

³⁸ LAFLI 2003.

³⁹ Ibid. 98; 107.

⁴⁰ TULUK 1999 Abb. 9–10.

⁴¹ LAFLI 2012, 181.

⁴² ANDERSON-STOJANOVIĆ 1987, 105.

Bibliography

- AHRENS ET AL. 2013
 ANDERSON-STOJANOVIĆ 1987
 ATIK 1995
 BORTHEIM ET AL. 2014
 COTTICA 1998
 COTTICA 2000
 DEGEEST ET AL. 1999
 HAYES 1971
 HAYES 1992
 HÜBNER 2006
 LAFLI 2003
 LAFLI 2012
 LAFOREST ET AL. 2013
 LOCHNER ET AL. 2005
 METAXAS 2005
 MORTENSEN 2014
 OKUNAK 2005
 PÉREZ-ARANTEGUI/PAZ-PERLATA/
 ORTIZ-PALOMAR 1996
 RIBECCHINI ET AL. 2008
 ŞİMŞEK/DUMAN 2007
 ŞİMŞEK ET AL. 2011
 SELSVOLD ET AL. 2012
 TULUK 1999
 WENN ET AL. 2010
- S. AHRENS ET AL., Hierapolis 2012. Excavations and analysis. Nicolay Ark. Tidskr. 120, 2013, 13–22.
 V. R. ANDERSON-STOJANOVIĆ, The chronology and function of ceramic unguentaria. Am. Journal Arch. 91, 1987, 105–122.
 N. ATIK, Die Keramik aus der Südthermen von Perge (Tübingen 1995).
 K. BORTHEIM ET AL., Hierapolis 2013. Revisiting old finds and procuring some new ones. Nicolay Ark. Tidskr. 123, 2014, 78–84.
 D. COTTICA, Ceramiche bizantine dipinte ed unguentari tardo antichi dalla ‘Casa dei Capitelli Ionici’ a Hierapolis. Riv. Arch. 22, 1998, 81–90.
 D. COTTICA, Unguentari tardo antichi dal Martyrion di Hierapolis, Turchia. Mém. École Française Rome 112/2, 2000, 999–1021.
 R. DEGEEST ET AL., The late roman unguentaria of Sagalassos. Bull. Ant. Beschaving 74, 1999, 247–262.
 J. W. HAYES, A new type of early Christian ampulla. Annu. British School Athens 66, 1971, 243–248.
 ID., Excavations at Saraçhane in Istanbul 2. The pottery (Princeton 1992).
 G. HÜBNER, Hellenistic and Roman *unguentaria*: function-related aspects of the shapes. In: D. Malafitana/J. Poblome/J. Lund (eds.), Old Pottery in a New Century: Innovating Perspectives on Roman Pottery Studies. Atti del Convegno Internazionale di Studi, Catania, 22–24 Aprile 2004. Monogr. Ist. Beni Arch. e Mon. 1 (Catania 2006) 27–40.
 E. LAFLI, Studien zu hellenistischen, kaiserzeitlichen und spätantik-frühbyzantinischen Tonunguentarien aus Kilikien und Pisidien (Südtürkei): der Forschungsstand und eine Auswahl von Fundobjekten aus den örtlichen Museen (Diss. Univ. Köln 2003).
 ID., Roman and late Roman (?) terracotta unguentaria, 1988–2005. In: C. S. Lightfoot/E. A. Ivison (eds.), Amorium report 3: the lower city enclosure. Finds reports and technical studies (Istanbul 2012) 181–192.
 C. LAFOREST/D. CASTEX/F. D’ANDRIA, About the Use of Monumental Tombs in the Roman and Early Byzantine Periods in Asia Minor: Case of Tomb 163d in the North Necropolis of Hierapolis (Phrygia, Turkey). Presentation at IIe Congresso internacional sobre Arqueologia de Transicao: O Mundo funerario, Evora, Portugal, 29 de Abril–1 de Maio 2013.
 S. LOCHNER/R. SAUER/R. LINKE, Late roman unguentaria? A contribution to Early Byzantine wares from the view of Ephesus. In: J. M. Gurt I Esparraguera/J. Buxeda i Garrigos/M. A. Cau Ontiveros (eds.), LRCW 1. Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean: Archaeology and Archaeometry 1. BAR Internat. Ser. 1340 (Oxford 2005) 647–654.
 S. METAXAS, Frühbyzantinische Ampullen und Amphoriskoi aus Ephesos. In: F. Krinzinger (ed.), Spätantike und mittelalterliche Keramik aus Ephesos. Arch. Forsch. 13 (Wien 2005) 67–123.
 J. MORTENSEN, The Implications of Content Analysis for the Interpretation of Unguentaria in Museum Collections (M. S. of Anthropology thesis Univ. Wisconsin-Milwaukee 2014).
 M. OKUNAK, Hierapolis Kuzey Nekropolü (159D Nolu Tümülüs) (Anit Mezar ve Buluntuları Univ. Pamukkale 2005).
 PÉREZ-ARANTEGUI/J. A. PAZ-PERALTA/E. ORTIZ-PALOMAR, Analysis of the products in two roman glass unguentaria from the colony of Celsa (Spain). Journal Arch. Scien. 23, 1996, 649–655.
 E. RIBECCHINI ET AL., Gas chromatographic and mass spectrometric investigation of organic residues from roman glass unguentaria. Journal Chromatography A 2283, 2008, 158–169.
 C. ŞİMŞEK/B. DUMAN, Laodikeia’da bulunan Gec Antik Ca Unguentariumlar. Adalya 10, 2007, 285–307 (with English summary).
 C. ŞİMŞEK/M. OKUNAK/M. BILGIN, Laodikeia Nekropolü (2004–2010 Yulları) (Istanbul 2011).
 I. SELSVOLD/L. SOLL/C. C. WENN, Surveys and saints. Hierapolis 2011. Nicolay Ark. Tidskr. 117, 2012, 13–22.
 G. G. TULUK, Die Unguentarien im Museum von Izmir. Anatolia Antiqua 7, 1999, 127–166.
 C. C. WENN/E. M. SUND/K. BORTHEIM, Excavating a re-used tomb – challenges and methods. Tomb 42, East Necropolis of Hierapolis, Turkey. Nicolay Ark. Tidsskr. 111, 2010, 19–26.

