

Flasks and fish



Abstract: For more than 600 years Aqaba flasks were manufactured at Aila. In the Roman, Byzantine and early Islamic periods they occur at a fair number of sites in the southern Levant, in particular in the Arava Valley and the Negev desert. A flask with fish residue was discovered in a domestic context at Petra. The residue was identified as *garum* prepared from Red Sea fish. The evidence for the production of fish sauce at Aila raises the question of whether flasks and fish products are interconnected. It is suggested here that the wide distribution of flasks is related to the export of *garum* from Aila. Admittedly, so far the suggestion is largely hypothetical; however, the importance of regional fish trade and consumption, attested at many inland sites, and the fishing facilities on the Red Sea point to a prevailing diet of fish products.

Keywords: Aqaba flasks, *garum/allec/haimation/salsamenta*, fish trade, fish consumption, Red Sea fishing, Nessana papyrus

Flasks comprise a category of household ware of a fairly distinct shape; they are not too common, yet their specific shape persists over a long timespan in different Near Eastern cultures and regions. The paper focuses on flasks from sites in the area of the Byzantine province of *Palaestina Tertia*, dating from the Roman and early Islamic periods,

Renate Rosenthal-Heginbottom

Independent researcher

Acknowledgments

I sincerely thank Benjamin Dolinka for sharing with me his expertise and for his kind permission to mention and include the Horvat Dafit flasks from his PhD thesis (Dolinka 2006). I warmly thank Patricia Kögler for transferring the drawings to a uniform scale.

I wish to thank the reviewer for referring me to the Yotvata finds and publication.

and on the evidence for the production and consumption of fish products. It is generally assumed that the primary function of flasks was the transport of water for

personal use by travellers, akin to modern canteens, yet their breakable material is not well suited for travel (Fellmann Brogli 1996: 231; Berlin 2015: 638–639).

FLASKS

The characteristic feature of the flasks discussed here is the irregular body shape, circular in a front view and barrel-shaped in a side view. The body was formed by joining two hemispherical separate bowls made on the wheel and adding neck and handle(s). A rare variant has a football-shaped body [Fig. 3:3]. The body's heavy unsmoothed concentric wheel ridges are typical. The tall narrow neck ends in a rounded, collared or slightly out-turned rim [Figs 1:1–4, 2:1–6] and can be ridged [Fig. 3:1–3]. Two handles run from mid-neck to the shoulder, with some flasks

single-handled [Fig. 2:1–3]. With a height less than 20 cm, the sturdy flasks are relatively small. A less common variant with a lentoid body, with and without concentric wheel-ridging and two loop handles on the upper shoulder is dated to the Byzantine period; one complete and five fragmentary vessels came to light in the fills of the Northern Church at Rehovot-in-the-Negev (Rosenthal-Heginbottom 1988: 88–89, Pl. III, 140–141) and at Mampsis (unpublished, Rosenthal-Heginbottom in preparation: Figs 18, 28, 33).

FINDSPOTS

The discovery of a flask with remains of fish sauce at ez-Zantur in Petra raises the question of the vessels' role in household contexts (Studer 1994; Desse-Berset and Studer 1996; Fellmann Brogli 1996: 231–232, 240–241, 267, Fig. 827, 230, Fig. 723; Kolb 1996: 68–71). The flask with a very pale brown exterior surface came to light in Room 27 of a house in EZ II, with two neck fragments recovered in adjacent rooms (Fellmann Brogli 1996: 232, 267, Figs 828–829) [Fig. 1:2–3]. These finds can be attributed to a timespan from the early 380s until the early 5th century, when the 419 CE earthquake caused the end of the ez-Zantur habitation (Kolb 1996: 74–75). In the 1997 excavations at ez-Zantur, another half flask

was found in Room 6 of another house (EZ IV) together with quantities of ceramics and glass vessels, buried in the 363 CE earthquake (Kolb, Keller, and Gerber 1998: 273–274, Figs 17.G, 18). This type of flask was manufactured at Aila (Aqaba/Eilat), where two pottery kilns of the 7th century were excavated (Melkawi, 'Amr, and Whitcomb 1994: 456, 459, Fig. 10, j, k) [Fig. 2:1–2]. A flask fragment from the Aqaba kilns was retrieved in a large early Islamic complex probably intended for habitation at Humayma (Oleson et al. 1995: 339, 352, Fig. 19, 4). At Horvat Dafit in the Arava Valley, some 20 km north of Aila, several Aqaba Ware flasks are dated to the 2nd–3rd centuries CE; these include flasks with ridged necks

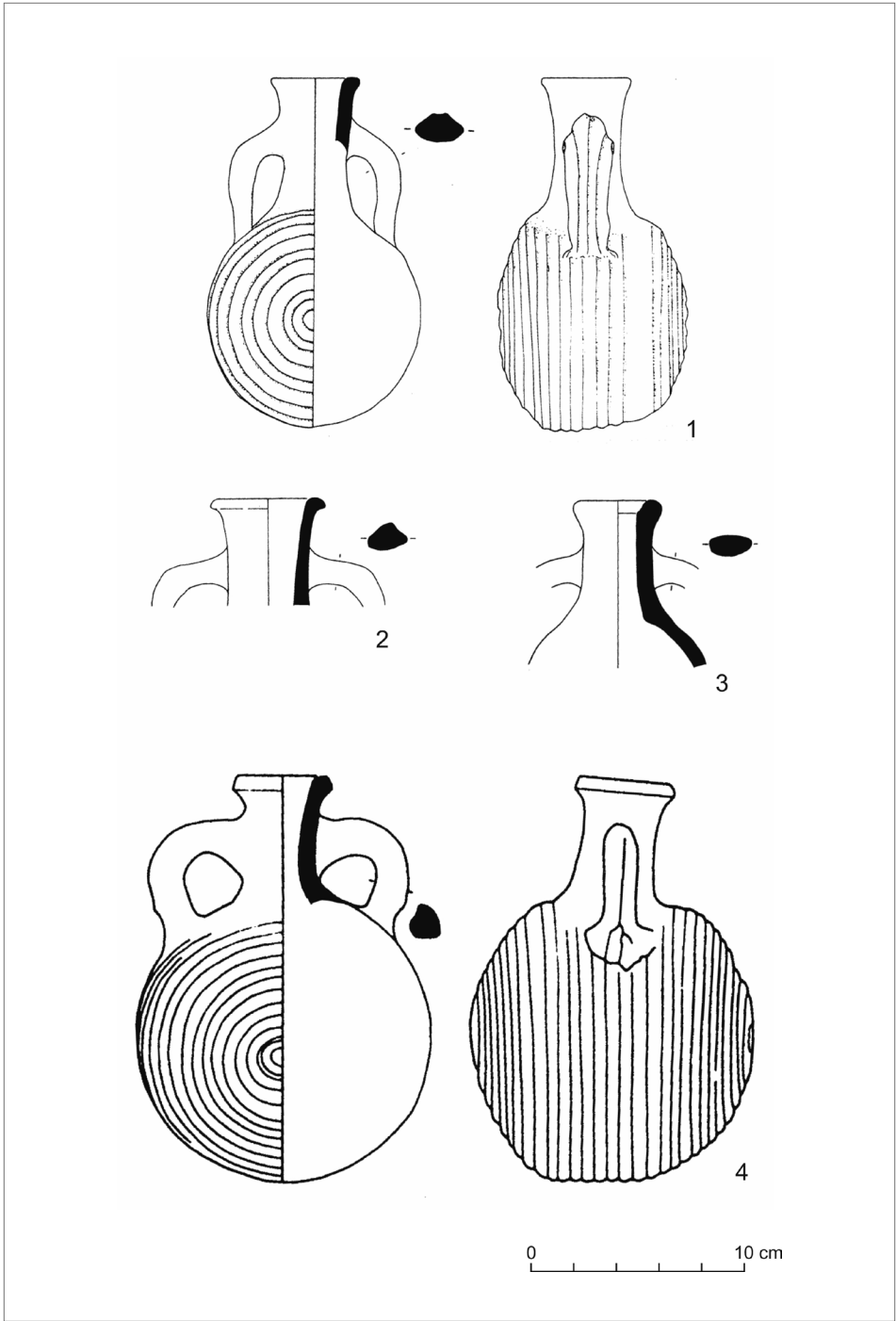


Fig. 1. Flasks from Petra ez-Zantur (After: 1 – Fellmann Brogli 1996: Fig. 827; 2–3 – Fellmann Brogli 1996: Figs 828–829; 4 – Kolb, Keller, and Gerber 1998: Fig. 17.G)

[see Fig. 3:1–3] (Dolinka 2006: 172, Fig. 5.16a–c) and three others with different neck and rim forms (Dolinka 2006: 173, Fig. 5.17a–c). At Yotvata in the Arava Valley, some 40 km north of Eilat/Aqaba, three complete flasks and a neck fragment like the one in Fig. 1 came to light in the fort debris. One of them was found on the earliest Roman floor and dated by some 30 coins, the latest to 354–358 CE (Magnes 2015: 76, Figs 2.8, 9, 2.9, 1–2. Colour Fig. 18, 1). Considering the evidence for *garum* production at Aila in the late Roman period, Dolinka (2006: 173) tentatively suggests that the flasks were used to store and transport the fish sauce. The distribution of the Aqaba Ware flasks and their dating contexts clearly indicate that the shape was manufactured over a period of about 600 years, from the early-to-mid-2nd century (Dolinka 2006: 172) until the early Islamic period (Melkawi, ‘Amr, and Whitcomb 1994).

In the late Roman period, flasks are reported from a fair number of settlements and forts in the Negev (Dolinka 2006: 173). Besides the already mentioned lentoid flasks, the as yet unpublished flasks from habitation debris at Mampsis include single-handled vessels [Fig. 2:3–4] like the Aqaba Ware flasks [see Fig. 2:1–2] and flasks of similar size with two handles (Rosenthal-Heginbottom in preparation: Fig. 18, 37–41) [Fig. 2:5–6]; hence the number of handles is not related to the size of the vessels. Of the five flasks, three are fired greenish buff, one pinkish gray and one brown. The fabric appears to be different from the 2nd–3rd century Aqaba Ware Type 3 fabric of light red, fired to a very pale brown on the exterior (Dolinka 2006: 172) [see Fig. 3:1–3].

Without contextual dating evidence, the Mampsis flasks are attributed to the late Roman–early Byzantine periods. Benjamin Dolinka’s exhaustive research of more than 50 ceramic assemblages in Israel and Jordan resulted in detecting flasks from Aila at ‘En Hazeva, Sha’ar Ramon, Rehovot-in-the-Negev, Oboda and Mampsis (Dolinka 2006: 173). The complete flask from ‘En Hazeva was found in the destruction debris of the 363 CE earthquake; it has a ridged neck, a wide flat base, and was fired a light yellowish brown (Erickson-Gini 2010: 131, 138, Fig. 4.27) [Fig. 2:7].

An intact flask, shaped like an American football, was found at Horvat Dafit; with a height of 16 cm it conforms to the standard flask type (Benjamin Dolinka, personal communication) [Fig. 3:4]. A parallel from Oboda is dated to the early 3rd century (Erickson-Gini 2010: 104–105, 111, Fig. 2.39; mentioning a parallel from Moyat ‘Awad). The micaceous flask in thick yellowish red ware was found in the pantry of a private house, suddenly abandoned sometime in the first half of the 3rd century CE, probably after 220 (Erickson-Gini 2010: 101). While the Horvat Dafit flask is in Aqaba Ware, the Oboda flask is of a different origin; Erickson cites a 2nd–3rd century parallel from Shiqmona (Elgavish 1977: Pl. II, 13) and another recovered from the nets of a fisherman fishing along the coast between Ashdod and Herzliya (seen by Tali Erickson-Gini). The shape corresponds to the Aswan flasks of the late Roman and Byzantine periods, however without handles and not ribbed (Bailey 2011: 173, Fig. 1). Bailey notes that the Aswan flasks, often pitched to stop seep-

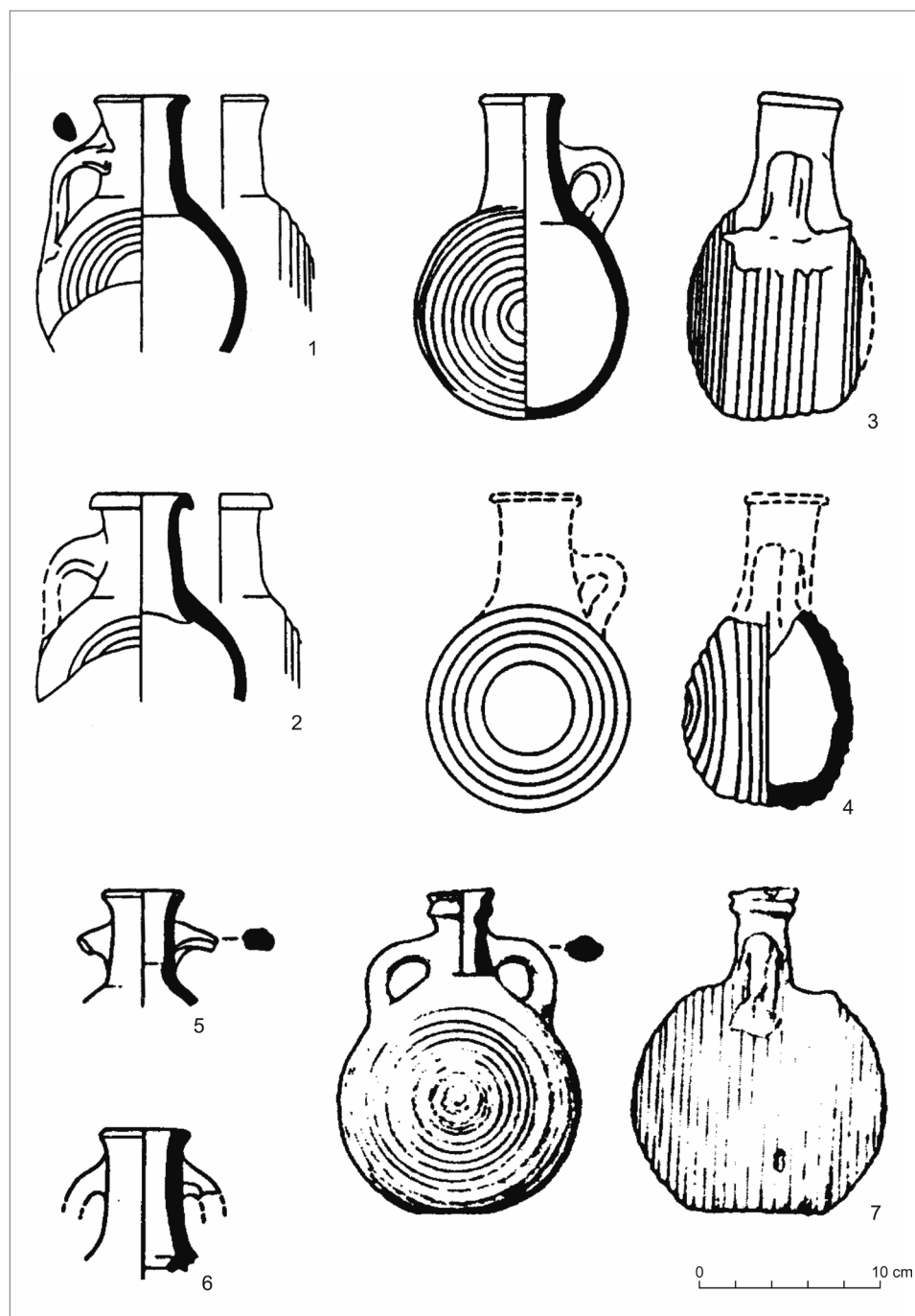


Fig. 2. Flasks from Aqaba, Mampsis and 'En Hazeva (After: 1-2 – Melkawi, 'Amr, and Whitcomb 1994: Fig. 10 j,k; 3-6 – Rosenthal-Heginbottom in preparation: Figs 18,37-41; 7 – Erickson-Gini 2010: Fig. 4.27)

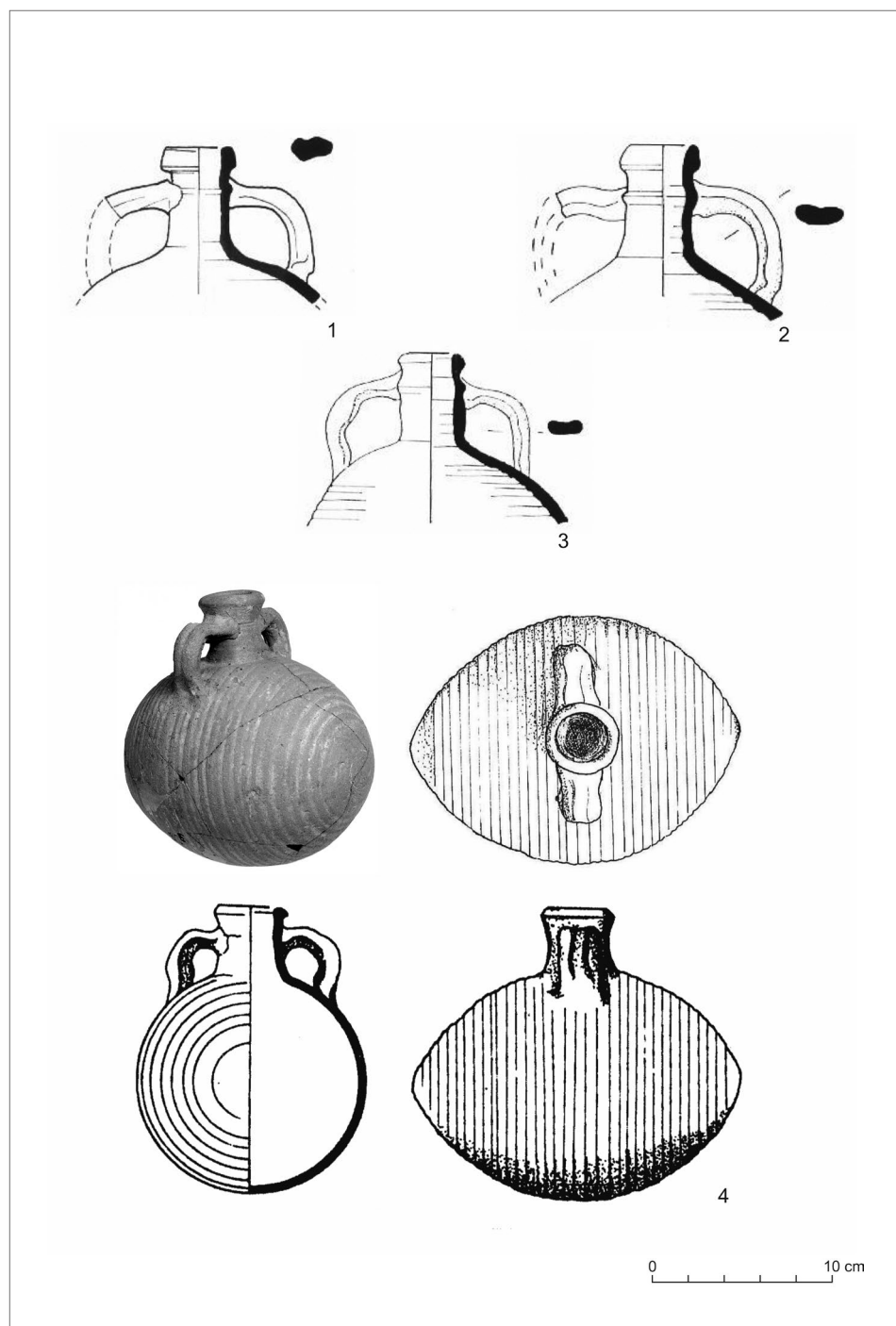


Fig. 3. Flasks from Horvat Dafit (1–3 – after Dolinka 2006: 172, Fig. 5.16a–c; 4 – courtesy B. Dolinka)

age of the contents, were primarily wine containers. Among the 27 flasks of different sizes, found in a large house located near the Temple of Souchos at Dionysias

in the western Fayum, two were filled with remains of whole fish, indicating that fish products were clearly secondary (Bailey 2011: 176, 179).

CONTEXT

The residue of fish sauce in the flask from Petra [Fig. 1:1] and the evidence for local production of fish sauce at Aqaba/Aila (Van Neer and Parker 2008) raises the question of its consumption in the southern Levant in particular and of the importance of salted fish consumption in general. Two sites are notable. In Herod the Great's palace at Masada, fish sauce was among the luxury products imported from the West; the *allec* (thick fish sauce) from Masada was a high-quality product, itself a by-product of high-quality *garum* (Cotton et al. 1996: 232). The authors attribute the fish sauces to the Herodian phase of occupation, referring to the store-room complex dated about 30–20 BC, yet concede the possibility that some of the imported foodstuff from the West could have been part of the Roman army's supply, perhaps for Silva and his staff (Cotton et al. 1996: 236–237). Famous for its fishing activities was Magdala on the Sea of Galilee, the Greek name of Tarichaea (fish salting) and the Hebrew name of Migdal Nunaya (fish tower) referring to the industry (Zangenberg 2003: 93; Notley 2014: 149–150).

The evidence from Masada and Magdala predates the finds from Petra and Aila, yet the living environment is similar, representing two inland sites far-removed from fresh fish supplies and two ports with ample fishing resources. The Petra flask contained thousands of bone remains of

fish of the Clupeiformes order measuring a few centimeters in length, which probably originated from the Red Sea like most of the fish recorded at Petra, the bones representing fish sauce residue, *garum* or *allec* (Studer 1994; Desse-Berset and Studer 1996: 385, Fig. 1027; Desse-Berset and Desse 2000: 94; Studer 2007: 263). A small Clupeiformes vertebra came to light in the debris of the kitchen fireplace, in a room adjacent to the room in which the flask was discovered, indicating *salsamenta*, or pickled fish (Desse-Berset and Studer 1996: 385). The question whether to interpret the residue as evidence for imported preserved fish or for production of fish sauce at the site will be addressed below. Of particular importance for the evaluation of the Petra finds is the discovery of a jar with fish bones in a domestic complex at Aqaba/Aila, from an occupation phase attributed to the late 1st century. The vessel is a local 'ribbed-neck jar', the most common storage jar at Aila in the 1st–3rd centuries CE (Van Neer and Parker 2008: 1822–1823, Figs 2–4). A study of the fish bones leads to the conclusion that this was a product designated as *haimation* by classical authors, based on the almost exclusive use of the gill apparatus of the tuna species, and that the production was in the jar itself and that it was a local Red Sea product. To date, no salting installations have ever been discovered in the Red Sea area, yet Wim Van Neer and S. Thomas

Parker point out that fishing in open water was paramount in order to net the large numbers of fish required for the production of *haimation*, hence small-scale, domestic manufacture of fish sauce seems unlikely. The fish bones recovered at Aila, dated between the 1st and 4th century CE, indicate that offshore fishing was well established. In addition, there is evidence for the production of fish sauce at Berenike and Quseir al-Qadim on the western shore of the Red Sea (Van Neer and Parker 2008: 1824–1825).

Of particular interest is the fish residue, including some *Clupeiformes* specimens, found in a midden sedi-

ment related to a kitchen complex for food processing and preparation at Jabal Hārūn (Frösén et al. 2002: 402, 404–406). The residue resembles the substances in the Petra flask and the Aila jar, and Jacqueline Studer concludes that it represents the residents' culinary activities rather than the stomach contents of larger fish. As the thick fish sauce (*allec*) is filtered to be used specifically as juice, the substance is more likely to be refuse from the kitchen rather than the remains of a meal. Though the evidence is not unequivocal it is presumed that, like in Petra, fish sauce was imported rather than locally prepared.

FISH CONSUMPTION

There is ample evidence for extensive trade and consumption of fish in the southern Levant during the Roman and Byzantine periods, the fish deriving from local or regional fresh water sources, from the Mediterranean and the Red Sea, as well as from the Nile Valley. Sites include Caesarea Maritima, En Gedi, En Boqeq, Gamla, Horvat Rimmon, Horvat Karkur, Jerusalem, Masada, Megiddo, Petra, Qarantal, Sumaqa, Tamara, Tel Ashqelon, Tel Hamid, Tel Harassim, Tel Heshban, Tel Malhata, Upper Zohar, Yavneh-Yam, Zichrin and Zippori (Van Neer et al. 2004: 111–118, Tables 3, 4; Kroll 2010: 98–110, 112–114). Other sites can be added, and although the list is not exhaustive the impact of Red Sea fishing on the region is definite. A large amount of fish bones was discovered in the fort of Yotvata (Halbmaier 2015: 229) and in the forts of el-Lejjūn and Da'janiya on the Arabia frontier (Van Neer and Parker

2008: 1825). It would be worthwhile to collect the evidence for fish consumption by the military in a further study. The consumption of fish is recorded at monastic complexes such as Dayr al-Qaṭṭār al-Byzantī (Holmgren, Kaliff, and Svensson 1997: 324), Dayr 'Ayn 'Abātā (Politis 1992: 284) and Jabal Hārūn (Frösén et al. 2002: 402). The diet of monks included a thick soup made of small salted fish, referred to in the sources as *liquamen de pisciculis* (Dembińska 1985: 441). In the Nessana papyri, a shipment of fish is mentioned in a correspondence between the abbot Patrick from Nessana and the deacon Stephan from another unidentified town. Patrick requests a shipment of 80 pounds of fish, *skaros* in Greek, and 20 large heads. The fish referred to is probably parrotfish, transported from the Red Sea, some 150 km away from Nessana, considerable amounts of which were recovered from the excavations (Kraemer

1958: 139–141, P. Colt 47; Colt 1962; Jackson 1962: 68). In the ez-Zantur quarter of Petra, parrotfish represents 80% of the fish remains in the Byzantine period

(Studer 2007: 263). The archaeozoological evidence from the sites mentioned indicates a strong marine component in the diet.

CONCLUDING REMARKS

The manufacture of *garum* went generally together with that of *salsamenta*. While no salting tanks have been recorded along the Red Sea coast to date, fish sauce could be produced by mixing salt and small fish, and letting the mixture ferment in containers of any type and size. Historical sources report smaller containers as being more common (Curtis 1991: 15), of the kind attested by the jar from Aila, a site now known for the production and export of salted/pickled fish and fish sauce (Dolinka 2003: 95–96, Notes 245–252; Retzlaff 2003: 55; Van Neer and Parker 2008: 1825). It remains to be seen how the finished product was distributed. Can it be concluded on the basis of the wide distribution of the Aqaba flasks that they served as export containers for the *garum* manufactured at Aqaba, as suggested by Dolinka (2006: 173)? Or is it more plausible that the flasks are secondary vessels, filled from a larger storage vessel for use in the kitchen? In that case, it would not be necessary to use a relatively uniform container of non-local origin—any jug would do. Hence, it is tentatively suggested that the Aqaba flasks were regional exports with fish sauce. Desse-Berset and Studer (1996: 387) point out that it is difficult to determine whether the fish transported to Petra was fresh, dried, smoked or salted. However, it is unlikely that the sauce was produced at Petra, due to the fact that fresh fish could be traded over a distance of not more

than 50 km, provided that in a day two parties met at a central point; over larger distances preserved fish products were transported (Van Neer et al. 2004: 106; Kroll 2010: 202–203). Only preserved fish were brought to Petra, which was situated approximately 100 km away from the Red Sea, entailing a three-days ride on camelback (Van Neer et al. 2004: 118, Table 4). The preserved fish reached Petra from even further afar, either from the Jordan or possibly from the Nile (Van Neer et al. 2004: 129). Yet, in all probability the fish sauce in the Aqaba flask was manufactured at Aila and exported to Petra, and this holds true for the residue recorded at Jabal Hārūn (Frösén et al. 2002: 402).

Nothing can be said about the scope of *garum* manufacture at Aila. Considering the evidence from Egypt, where the Nile provided ample fishing opportunities, the production and transport of fish sauce was not a large-scale industry, being limited instead to local consumption (Drexhage 1993: 54). Nonetheless, a guild of *garum* merchants (*γαροπῶλαι*) is mentioned in one of the Oxyrhynchos papyri from the early 4th century CE (Drexhage 1993: 47), and at Tyre, a certain Probatios, a *garum* merchant, is recorded on the *tabula ansata* of a sarcophagus (Rey-Coquais 2006: 79–80, No. 112). Thus, the importance of *garum* production and consumption in the Eastern Mediterranean is beyond doubt.

Dr. Renate Rosenthal-Heginbottom

Independent researcher

renate34@gmx.de

How to cite this article: Rosenthal-Heginbottom, R. (2021). Flasks and fish. *Polish Archaeology in the Mediterranean*, 30/2, 581–593. <https://doi.org/10.31338/uw.2083-537X.pam30.2.06>

References

- Bailey, D.M. (2011). Wine containers: Aswan flasks. In D.A. Aston, B. Bader, C. Gallorini, P.T. Nicholson, and S. Buckingham (eds), *Under the potter's tree: Studies on ancient Egypt presented to Janine Bourriau on the occasion of her 70th birthday* (=Orientalia Lovaniensia Analecta 204) (pp. 173–188). Leuven: Peeters
- Berlin, A.M. (2015). Hellenistic period. In S. Gitin (ed.), *The ancient pottery of Israel and its neighbors: From the Iron Age through the Hellenistic period II* (pp. 629–745). Jerusalem: Israel Exploration Society; W.F. Albright Institute of Archaeological Research; American Schools of Oriental Research
- Colt, H.D. (1962). Biological remains. In H. Dunscombe Colt (ed.), *Excavations at Nessana I* (pp. 66–67). London: British School of Archaeology in Jerusalem
- Cotton, H., Lernau, O., Goren, Y., and Johnson, B. (1996). Fish sauces from Herodian Masada. *Journal of Roman Archaeology*, 9, 223–238
- Curtis, R.I. (1991). *Garum and salsamenta: Production and commerce in materia medica* (=Studies in Ancient Medicine 3). Leiden: E.J. Brill
- Dembińska, M. (1985). Diet: A comparison of food consumption between some Eastern and Western monasteries in the 4th–12th centuries. *Byzantion*, 55(2), 431–462
- Desse-Berset, N. and Desse, J. (2000). Salsamenta, garum et autres préparations de poisson: ce qu'en disent les os: ce qu'en disent les os. *Mélanges de l'École française de Rome – Antiquité*, 112(1), 73–97
- Desse-Berset, N. and Studer, J. (1996). Fish remains from ez Zantur (Petra, Jordan). In A. Bignasca et al., *Petra, Ez Zantur I. Ergebnisse der schweizerisch-liechtensteinischen Ausgrabungen 1988–1992* (pp. 381–387). Mainz am Rhein: Philipp von Zabern
- Dolinka, B.J. (2003). *Nabataean Aila (Aqaba, Jordan) from a ceramic perspective: Local and intra-regional trade in Aqaba ware during the first and second centuries AD. Evidence from the Roman Aqaba Project* (=BAR International Series 1116). Oxford: Archaeopress
- Dolinka, B.J. (2006). *ARABIA ADQUISITA? Ceramic evidence for Nabataean cultural continuity during the Antonine and Severan periods: The Aqaba Ware from Horvat Dafit* (Ph.D. diss.). University of Liverpool
- Drexhage, H.-J. (1993). Garum und Garumhandel im römischen und spätantiken Ägypten. *Münstersche Beiträge zur antiken Handelsgeschichte*, 12, 27–54
- Elgavish, J. (1977). *Archaeological excavations at Shiqmona. The pottery of the Roman period*. Haifa: The City Museum of Ancient Art (in Hebrew)
- Erickson-Gini, T. (2010). *Nabataean settlement and self-organized economy in the Central Negev: Crisis and renewal* (=BAR International Series 2054). Oxford: Archaeopress

- Fellmann Brogli, R. (1996). Die Keramik aus den spätrömischen Bauten. In A. Bignasca et al., *Petra, Ez Zantur I. Ergebnisse der schweizerisch-liechtensteinischen Ausgrabungen 1988–1992* (pp. 219–281). Mainz am Rhein: Philipp von Zabern
- Frösén, J., Fiema, Z.T., Koistinen, K., Studer, J., Danielli, C., Holmgren, R., Gerber, Y. Heiska, N., and Lahelma, A. (2002). The 2001 Finnish Jabal Hārūn Project: Preliminary report. *Annual of the Department of Antiquities of Jordan*, 46, 391–408
- Halbmaier, R. (2015). The faunal remains. In G. Davies and J. Magness, *The 2003–2007 excavations in the late Roman fort at Yotvata* (pp. 219–238). Winona Lake, IN: Eisenbrauns
- Holmgren, R., Kaliff, A., and Svensson, J. (1997). The 1995–1996 excavation of Dayr al-Qaṭṭār al-Byzantī: A preliminary report. *Annual of the Department of Antiquities of Jordan*, 41, 321–340
- Jackson, J.W. (1962). Report on the animal remains found at Auja. In H.D. Colt (ed.), *Excavations at Nessana I* (pp. 67–69). London: British School of Archaeology in Jerusalem
- Kolb, B. (1996). Die spätrömischen Bauten. In A. Bignasca et al., *Petra, Ez Zantur I. Ergebnisse der schweizerisch-liechtensteinischen Ausgrabungen 1988–1992* (pp. 51–89). Mainz am Rhein: Philipp von Zabern
- Kolb, B., Keller, D., and Gerber, Y. (1998). Swiss-Liechtenstein excavations at az-Zanṭūr in Petra, 1997. *Annual of the Department of Antiquities of Jordan*, 42, 259–277
- Kraemer, C.J. (1958). *Excavations at Nessana III. Non-literary papyri*. Princeton, NJ: Princeton University Press
- Kroll, H. (2010). *Tiere im Byzantinischen Reich: archäozoologische Forschungen im Überblick*. Mainz: Verlag des Römisch-Germanischen Zentralmuseums
- Magness, J. (2015). The pottery. In G. Davies and J. Magness, *The 2003–2007 excavations in the late Roman fort at Yotvata* (pp. 74–141). Winona Lake, IN: Eisenbrauns
- Melkawi, A., ‘Amr, K., and Whitcomb, D.S. (1994). The excavation of two seventh century pottery kilns at Aqaba. *Annual of the Department of Antiquities of Jordan*, 38, 447–468
- Notley, R.S. (2014). Genesis Rabbah 98, 17 – “And why is it called Gennosar?” Recent discoveries at Magdala and Jewish life on the Plain of Gennosar in the early Roman period. In S. Fine and A. Koller (eds), *Talmuda de-Eretz Israel: Archaeology and the rabbis in late antique Palestine* (pp. 141–157). Boston: De Gruyter
- Oleson, J.P., ‘Amr, K., Foote, R.M., and Schick, R. (1995). Preliminary report of the Ḥumayma excavation project, 1993. *Annual of the Department of Antiquities of Jordan*, 39, 317–354
- Politis, K.D. (1992). Excavations at Deir ‘Ain ‘Abata, 1991. *Annual of the Department of Antiquities of Jordan*, 36, 281–290
- Retzleff, A. (2003). A Nabataean and Roman domestic area at the Red Sea port of Aila. *Bulletin of the American Schools of Oriental Research*, 331, 45–65
- Rey-Coquais, J.-P. (2006). *Inscriptions grecques et latines de Tyr (=BAAL. Bulletin d'archéologie et d'architecture libanaises, Hors-série 3)*. Beirut: Ministère de la culture, Direction Générale des Antiquités

- Rosenthal-Heginbottom, R. (1988). The pottery. In Y. Tsafir, J. Patrich, R. Rosenthal-Heginbottom, I. HersHKovitz, and Y.D. Nevo, *Excavations at Rehovot-in-the-Negev I. The Northern Church* (=Qedem 25) (pp. 78–96). Jerusalem: Institute of Archaeology, Hebrew University of Jerusalem
- Rosenthal-Heginbottom, R. (in preparation). *The pottery of Mampsis. Final report of the 1965–1967 excavations conducted by Avraham Negev*
- Studer, J. (1994). Roman fish sauce in Petra, Jordan. In W. Van Neer (ed.), *Fish exploitation in the past: Proceedings of the 7th meeting of the ICAZ Fish Remains Working Group* (=Annales du Musée Royal de l'Afrique Centrale, Science Zoologiques 274) (pp. 191–196). Tervuren: Musée Royal de l'Afrique Centrale
- Studer, J. (2007). Animal exploitation in the Nabataean world. In K.D. Politis (ed.), *The world of the Nabataeans. Volume 2 of the International Conference "The World of the Herods and the Nabataeans" held at the British Museum, 17–19 April 2001* (=Oriens et Occidens 15) (pp. 251–272). Stuttgart: Franz Steiner Verlag
- Van Neer, W., Lernau, O., Friedman, R., Mumford, G., Poblome, J., and Waelkens, M. (2004). Fish remains from archaeological sites as indicators of former trade connections in the Eastern Mediterranean. *Paléorient*, 30(1), 101–147
- Van Neer, W. and Parker, S.T. (2008). First archaeozoological evidence for *himation*, the 'invisible' *garum*. *Journal of Archaeological Science*, 35(7), 1821–1827
- Zangenberg, J. (2003). Magdala – Reich an Fisch und reich durch Fisch. In G. Fassbeck, S. Fortner, A. Rottloff, and J. Zangenberg (eds), *Leben am See Gennesaret: Kulturgeschichtliche Entdeckungen in einer biblischen Region* (pp. 93–98). Mainz am Rhein: Philipp von Zabern

