Agnieszka Szulc-Kajak

Fishing Gear from Jiyeh (Porphyreon) : Preliminary Report

Polish Archaeology in the Mediterranean 22, 334-340

2013

FISHING GEAR FROM JIYEH (PORPHYREON)
PRELIMINARY REPORT

Agnieszka Szulc-Kajak
PCMA affiliate

Abstract: The assemblage of metal fishing gear from PCMA excavations at the site of Jiyeh in Lebanon has been presented in the context of similar finds from other coastal sites in the Levant, as well as in association with objects representing fishing gear from earlier, Lebanese fieldwork in Jiyeh. The set includes net-sinkers of the FRLS type (folded rectangular lead sinkers), as well as fishing line hooks and net-repair tools. The principal kinds of fishing nets are also discussed in the article, as well as other aspects connected with catching fish.

Keywords: Jiyeh, fishing, FRLS, lead, net sinkers

Several dozen examples of metal fishing gear were discovered at the site of Jiyeh (Porphyreon) in Lebanon during archaeological excavations carried out between 1997 and 2010. These included 22 complete fishing net and line sinkers [***Table 1***; ***Fig. 2***], mostly made of lead, as well as a few partly preserved examples and semi-products used in the production of such objects. Artifacts recovered from the current excavations corresponded to the assemblage recorded from excavations carried out in Jiyeh in 1975 and now held in the Beirut storeroom of the Directorate General of Antiquities of Lebanon. That collection included another few dozen objects classified as fishing gear. Singular examples of fishing gear were discovered also at Chhîm. Apart from the predominant lead net sinkers, the current assemblage from Jiyeh included other kinds of artifacts, like bronze hooks and tools for repairing fishing nets. A few semi-products in the form of lead sheet to be folded into rectangular weights were also discovered at the site, as was a stone casting mold.

Fishing net sinkers along with other fishing gear are found on many Levantine sites along the sea coast, in different contexts, at harbors and anchorages, in shipwrecks, as well as houses and graves. Underwater archaeology has been the source of the largest number of finds of this kind, dated to all periods beginning with the prehistoric, i.e., the assemblage from the Neolithic fishing village of Atlit-Yam (see Galili, Rosen *et alii* 2002; Galili, Lernau, Zohar 2004). Neolithic stone net weights are visibly specific in form, but the standardization of fishing gear, both sinkers and hooks, from the Bronze Age on makes it virtually impossible to date

Table 1. Metal fishing gear from excavations in Jiyeh from 1997 through 2010

Inv. No.	Material	Item	Dimensions cm L/W/H	Context no.	Figure
JY12M	Lead	Net sinker, FRLS	5.5/1/0.7	H/59/29	*Fig. 2*
JY13M	Lead	Net sinker, FRLS	5.7/0.9/0.6	H/59/29	*Fig. 2*
JY14M	Lead	Net sinker, FRLS	6.5/0.9/0.6	H/59/?	
JY15M	Lead	Net sinker, FRLS	5.4/0.5/0.7	H/59/?	*Fig. 2*
JY16M	Lead	Net sinker, FRLS	6.3/0.8/0.5	H/59	*Fig. 2*
JY63M	Lead	Net sinker, FRLS	7.5/1.5/0.8	QII/2	
JY145M	Lead	Truncated conical weight	3.1/3.1/3.7	D/10/4	
JY148M	Lead	Sheet metal, semi-finished net sinker of the FRLS type	6.1/2.7/1	D/49/2	
JY151M	Lead	Net sinker, FRLS	5.8/1/0.6	D/77/5	
JY207M	Lead	Net sinker, FRLS	4/1.9/0.6	D/79/7	
JY213M	Lead	Net sinker, FRLS	3.3/0.9/0.5	D/20/20	
JY222M	Lead	Sheet metal, thickened at the edges, semi-finished net sinker of the FRLS type	7.2/10.1/2	D/20/13	
JY308M	Lead	Net sinker, FRLS, decorated with oblique parallel lines	7.2/1.4/0.8	D/100/1	
JY315M	Lead	Net sinker, FRLS	7.2/1.4/0.7	D/Western dump/2	
JY325M	Lead	Sheet, semi-finished net sinker of the FRLS type	5.3/2.5/0.2	D/Eastern dump	
JY358M	Lead	Net sinker, FRLS, decorated	5.2/1/0.5	D/100/1	
JY364M	Lead	Net sinker, FRLS, decorated with a representation of an anchor?	4.5/2.1/1.1	D/100/1	*Fig. 2*
JY370M	Lead	Net sinker, FRLS	4.7/1/0.5	D/Western dump/2	
JY444M	Lead	Net sinker, FRLS	6.7/1.6/0.6	D/100/1	*Fig. 2*
JY450M	Lead	Net sinker, FRLS, decorated with oblique parallel lines	6.7/0.9/0.7	Northern dump	
JY456M	Lead	Sheet metal, semi-finished net sinker of the FRLS type, decorated	5.2/1.6/0.6	D/100/1	
JY568M	Lead	Net sinker, FRLS	6.2/0.7/0.6	D/107/1	
JY620M	Lead	Net sinker, FRLS	6/0.9/0.6	D/107/1	
JY642M	Lead	Net sinker, FRLS, decorated with oblique parallel lines	5.8/0.9/0.5	D/107/1	
JY659M	Lead	Net sinker, FRLS	7.9/1.7/0.5	D/107/3	
JY662M	Lead	Net sinker, FRLS	6.1/1.3/0.9	D/44/40	*Fig. 2*
JY663M	Lead	Net sinker, FRLS	6.7/.3/1	D/107/5	*Fig. 2*

them on typological grounds alone. The only exception are sinkers with decoration typical of the period, such as crosses or one or more letters. On the other hand, fishing methods unchanged from antiquity have been helpful in reconstructing old fishing techniques and determining types, net sizes etc.

Despite the paucity of descriptions of fishing net sinkers in publications, a number of typologies has been developed. The fullest such classification for the Eastern Mediterranean was presented in 2002 by Ehud Galili, Baruch Rosen and Jacob Sharvit, based on finds from underwater exploration in the vicinity of Haifa (Galili, Rosen, Sharvit 2002). It is widely cited, even in publications concerning other parts of the Mediterranean (e.g., Bernal Casasola 2010: 96–97). A storm near Haifa uncovered, among others, more than 1200 artifacts identified as fishing net sinkers. Most of them were made of lead, although there were a few produced of stone. The classification followed divisions of material, shape and production methods (Galili, Rosen, Sharvit 2002: 182–192). The most important typologies, announced previous to the described one, were that of Peter I. Kuniholm based on finds from a Byzantine shipwreck at Yassi Ada on the Turkish coast and using shape as a division criterion (Kuniholm 1982), and that of John P. Oleson, who distinguished 12 classes among the 155 net sinkers recovered from the harbors in Cesarea Maritima (Oleson [ed.] 1994: 68–73).

The prevalent type of net sinker found on coastal sites in the Eastern Mediterranean, including Jiyeh, is Oleson's class 12, which corresponds to Galili's type L.2.3, referred to in short as FRLS: "folded rectangular lead sinker". Sinkers of this kind were produced in two steps: rectangular pieces of lead were first cast in stone molds and then they were folded in half along the long axis over the lower line of a net. A stone mold for casting sinkers was discovered at Jiyeh [***Fig. 1***]. It is damaged, but it is still clear that it was used to cast a number of sinkers simultaneously. The sides were decorated with engraved decoration, including one or more images of fish and an anchor. Examples of casting molds have been recorded in Byzantine layers at Shiqmona and Kastra (Galili, Rosen, Sharvit 2002: 192, Fig. 13). The Yassi Ada wreck produced a bronze spoon with numerous traces of lead, which indicates that it was repeatedly immersed in liquid lead. Combined with lead waste from a production process of some kind, it

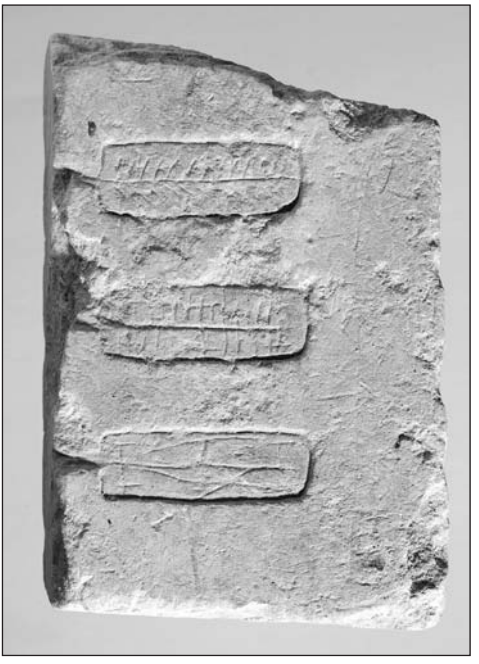

Fig. 1. Casting mold for fishing net sinkers (Photo M. Gwiazda)

suggests that the crew were making sinkers on shipboard to satisfy current needs (Kuniholm 1982: 309). FRLS were of different size, some were decorated, usually with a series of parallel lines, less often with geometric, drawn and letter patterns. The decoration was carved into the mold, hence the relief decoration on the net sinkers. The condition of the sinkers from Jiyeh does not allow the decoration to be traced in all cases. Some surely bore oblique parallel lines of a kind revealed by the casting mold from Jiyeh. An anchor was depicted on one of the sinkers [see ***Fig. 2***, JY13M].

FRLS sinkers are meaningfully superior in number to all other types. To date, only one conical sinker was discovered in Jiyeh compared to 21 of the FRLS type. Of the 159 sinkers found in the 7th century shipwreck at Dor, 153 belonged to this type (Galili, Rosen 2008: 69). Naturally, the sheer number of sinkers as such is hardly surprising considering that a single fishing net would have required quite a few and that sinkers in use are easily damaged when the net is cast and pulled up, and have to be replaced with a considerable frequency. FRLS sinkers weighed down the footrope or bottom rope of a net to stabilize it. Light fishing nets cast by hand would have had 17–18 sinkers each. The number was estimated by W.M. Flinders Petrie on the grounds of finds from a late Bronze Age tomb at Tell el-Ajjul near Gaza and confirmed by a group of 18 sinkers from the same period, found in a single context in a shipwreck off the Gelidonia Cape in Turkey (Pulak 1988: 32–33). The shipwreck at Ulu Burun, also off the Turkish coast, contained 107 FRLS sinkers in three scatters, twice 21 artifacts and once 35; it can be assumed that the scatters corresponded to three separate nets. Bigger nets could have taken even a few hundred sinkers. The size of a net can be estimated also based on the rope openings in the sinkers. According to E. Galili, if the opening diameter in the sinkers was about

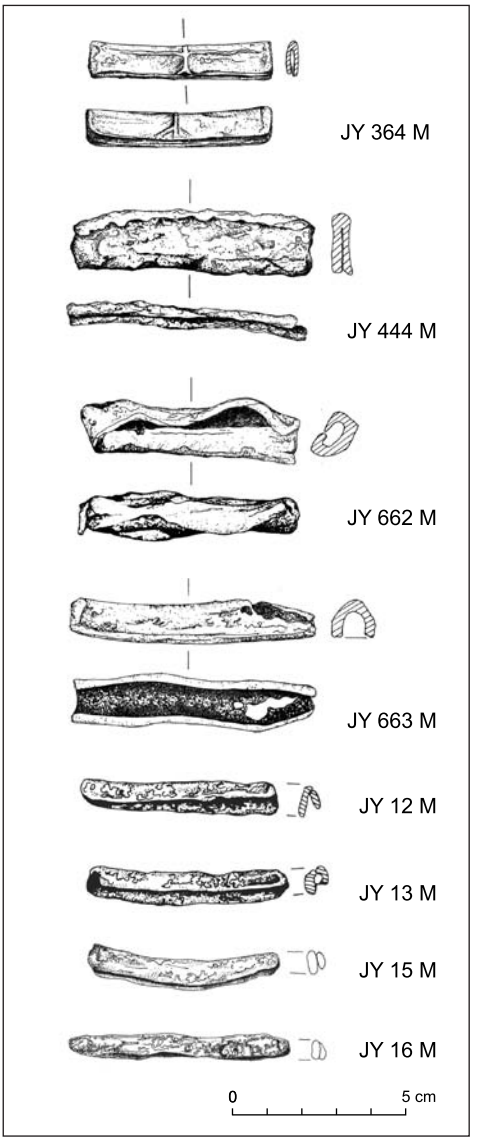

Fig. 2. Fishing net sinkers from the site of Jiyeh (Drawing A. Błaszczyk, M. Makowska)

1 mm, the net would have been a cast net. Diameters of 8–10 mm and more were typical of large nets, like dragnets /beach seines (Galili, Rosen, Sharvit 2002: 195–199). Examples of large nets were recorded in a shipwreck surveyed off Ashkelon, dated to the Hellenistic/early Roman period (Galili *et alii* 2010). All of the FRLS sinkers from Jiyeh belonged to the first and smallest category. The majority of rectangular net sinkers from Levantine coastal sites was made of lead, although there are some examples cast of copper or copper alloys, e.g., artifacts found at Tel Michal, in layers from the Persian period (Herzog *et alii* [eds] 1989: 281–282, Fig. 25.9).

Fishing hooks also did not change much over the ages. According to A.J. Parker, the oldest shipwreck to contain fishing hooks in the recorded assemblage is the Late Bronze Age ship from Ulu Burun (Parker 1992: 439). Through 2010 the excavations at Jiyeh had not yielded one hook that could be securely identified as fishing gear, but a few more or less complete bronze artifacts of this type can be seen in the material excavated in 1975 and now stored in Beirut. The same can be said of tools used to repair nets. Well preserved examples of a bronze fishing hook [***Fig. 3***] and a net-repairing tool [***Fig. 4***] were discovered during Polish excavations at the inland village of Chhîm.

Almost always fishing hooks were made of copper or copper alloys. They can be classified by size, point and the way the line was attached. The line would be wound around the upper end of the shaft, which was grooved for a better hold. Such grooving is observed on the hooks from Jiyeh and Chhîm, as well as Ulu Burun, for example (Bass *et alii* 1989: 5–7, Fig. 9). The shaft end could have been flattened

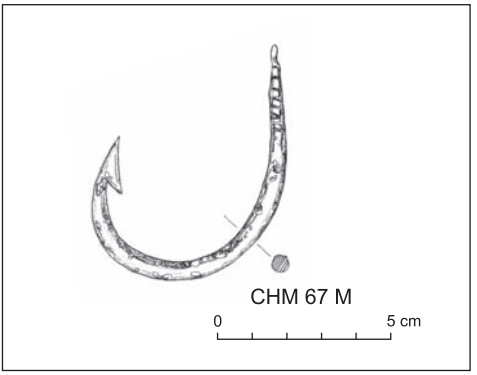

Fig. 3. Fishing hook from the village of Chhîm (Drawing A. Błaszczyk)

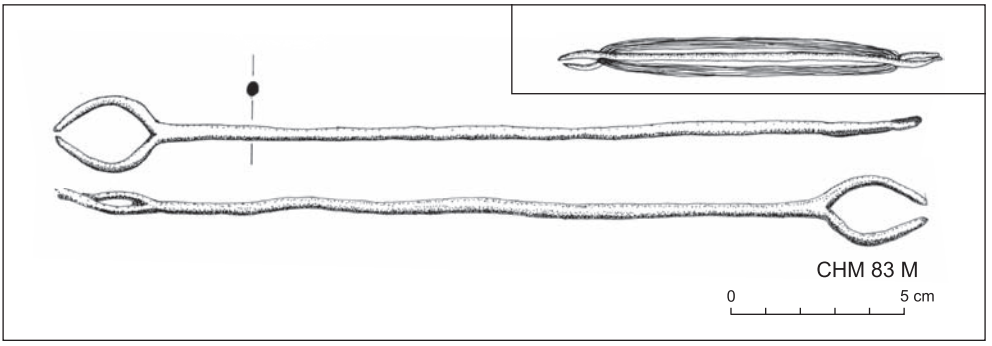

Fig. 4. Net-repair tool from the village of Chhîm; inset, reconstruction of the way in which the net-repair tool was used (Drawing A. Szulc-Kajak; reconstruction after Alfaro Giner 2010: 64, Fig. 3)

and examples with such flattened endings are known from the Caesarea harbor, either Roman or Byzantine in date, although the chronology of these artifacts is not entirely clear (Oleson [ed.] 1994: 67–68, Fig. 21). The line could also have been attached to a loop in the hook, as in artifacts from Egypt, from the Middle Kingdom (Brewer, Friedman 1989: 26–31, Figs 2.8, 2.11). A loop ending was present also on one of the hooks from Caesarea (Patrich 2008: 444, 457).

Bronze net-repair tools are also present in the assemblage from Jiyeh. Nets were easily damaged and it has been speculated that fishermen spent more time repairing nets than actually fishing. Thin long tools with forked endings at either end, the plane of these turned at right angle respective to one another, were used most commonly for such repairs. The forked endings bulged out in the middle, forming a loop shape, and the line used to repair a damaged net was wound onto these endings [***Fig. 4***, inset]. It is also possible that needles identified as tools for sail repairs were also used to repair fishing nets.

Artifacts representing fishing gear from Jiyeh were recorded mainly in test pits and secondary contexts. Little underwater archaeology has been carried out so far off the coast of the site. In effect, one cannot estimate the importance of fishing in the economy of the local village inhabitants. The choice of fishing methods is largely dependent on the natural environment. There are no rock shelves at Jiyeh which could have served to fish with a line and line-sinkers, so to catch fish on a hook the villagers would have had to search for a good spot or fish from a boat. On the other hand the sandy and stony beaches at Jiyeh are fairly convenient for fishing with nets cast by hand and this assumption is confirmed by numerous finds of sinkers used on such nets. Such nets cast in shallow waters would have been useful in catching shoals of coastal fish. Nets of this kind could have also been cast from boats. The type of coast at Jiyeh also seems appropriate for fishing with large dragnets, but so far there has been no evidence forthcoming for the use of nets of this kind. While this can be due to the state of research, it is also possible that local sea currents and submerged rocks occurring in places along the coast would have made the use of such nets unprofitable. The stone casting mold from Jiyeh is of particular importance, as it points to a local production of small rectangular net sinkers and, by interpolation, to the common use of such small cast nets in Jiyeh and vicinity.

Agnieszka Szulc-Kajak
szamsun@wp.pl

REFERENCES

Alfaro Giner, C.
2010 Fishing nets in the ancient world: The historical and archaeological evidence [in:] T. Bekker-Nielsen, D. Bernal Casasola (eds), *Ancient Nets and Fishing Gear. Proceedings of the International Workshop on "Nets and Fishing Gear in Classical Antiquity: A First Approach", Cádiz, November 15–17, 2007,* Cádiz: Servicio de Publicaciones de la Universidad de Cádiz, 55–82

Bass, G.F., Pulak, C., Collon, D., Weinstein, J.
1989 The Bronze Age shipwreck at Ulu Burun, 1986 campaign, *AJA* 93/1, 1–29
Bernal Casasola, D.
2010 Fishing tackle in *Hispania* [in:] T. Bekker-Nielsen, D. Bernal Casasola (eds), *Ancient Nets and Fishing Gear. Proceedings of the International Workshop on "Nets and Fishing Gear in Classical Antiquity: a First Approach"*, Cádiz: Servicio de Publicaciones de la Universidad de Cádiz, 83–138
Brewer, D.J., Friedman, R.F.
1989 *Fish and Fishing in Ancient Egypt* [=*Natural History of Egypt* 2], Warminster: Aris and Phillips
Galili, E., Lernau, O., Zohar, I.
2004 Fishing and coastal adaptations at 'Atlit-Yam — a submerged PPNC fishing village off the Carmel coast, Israel, *'Atiqot* 48, 1–34
Galili, E., Rosen, B.
2008 Fishing gear from a 7th-century shipwreck off Dor, Israel, *IJNA* 37, 67–76
Galili, E., Rosen, B., Gopher, A., Kolska-Horwitz, L.
2002 The emergence and dispersion of the Eastern Mediterranean fishing village evidence from submerged Neolithic settlements off the Carmel coast, *JMA* 15/2, 167–198
Galili, E., Rosen, B., Sharvit, J.
2002 Fishing-gear sinkers recovered from an underwater wreckage site, off the Carmel Coast, Israel, *IJNA* 31/2, 182–201
Galili, E., Sussman, V., Stiebel, G., Rosen, B.
2010 A Hellenistic/Early Roman shipwreck assemblage off Ashkelon, *IJNA* 39/1, 125–145
Herzog, Z., Rapp, G. Jr, Negbi, O. (eds)
1989 *Excavations at Tel Michal, Israel* [=*Publications of the Institute of Archaeology* 8], Tel Aviv: Sonia and Marco Nadler Institute of Archaeology, Tel Aviv University
Kuniholm, P.I.
1982 The fishing gear [in:] G.F. Bass, F.H. van Doorninck Jr., *Yassi Ada* I. *A Seventh-Century Byzantine Shipwreck* [=*Nautical Archaeology Series* 1], College Station, TX: Texas A&M University Press, 296–310
Oleson, J.P. (ed.)
1994 *The Harbours of Caesarea Maritima. Results of the Caesarea Ancient Harbour Excavation Project 1980–85*, II. *The Finds and the Ship* [=*BAR IS* 594], Oxford: BAR
Parker, A.J.
1992 *Ancient Shipwrecks of the Mediterranean and the Roman Provinces* [=*BAR IS* 580], Oxford: Tempus Reparatum
Patrich, J.
2008 *Archaeological Excavations at Caesarea Maritima. Areas CC, KK and NN. Final Reports* I. *The Objects*, Jerusalem: Israel Exploration Society
Pulak, C.
1988 The Bronze Age shipwreck at Ulu Burun, Turkey: 1985 campaign, *AJA* 92/1, 1–37