



AIECM3

ASSOCIATION INTERNATIONALE  
POUR L'ETUDE DES CÉRAMIQUES MÉDIÉVALES  
ET MODERNES EN MÉDITERRANÉE

---

**XI<sup>th</sup> CONGRESS AIECM3 ON  
MEDIÉVAL AND MODERN PERIOD  
MEDITERRANEAN CERAMICS PROCEEDINGS**

**XI. AIECM3 ULUSLARARASI  
ORTA ÇAĞ VE MODERN AKDENİZ DÜNYASI  
SERAMİK KONGRESİ BİLDİRİLERİ**

19-24 OCTOBER | EKİM 2015 ANTALYA

VOL | CİLT 1

Prepared for Publication by | Yayına Hazırlayan  
Filiz Yenişehirliođlu

---

à la mémoire de Juan Zozaya  
16 Août 1939-17 Janvier 2017

# XI<sup>th</sup> CONGRESS AIECM3 ON MEDIEVAL AND MODERN PERIOD MEDITERRANEAN CERAMICS PROCEEDINGS

## XI. AIECM3 ULUSLARARASI ORTA ÇAĞ VE MODERN AKDENİZ DÜNYASI SERAMİK KONGRESİ BİLDİRİLERİ

19-24 OCTOBER | EKİM 2015 ANTALYA

VOL | CİLT 1

Koç University VEKAM | Koç Üniversitesi VEKAM  
Vehbi Koç Ankara Studies Research Center 2018  
Vehbi Koç Ankara Araştırmaları Uygulama ve Araştırma Merkezi 2018

ISBN: 978-605-9388-09-2 (Tk)  
978-605-9388-10-8 (1.c)  
Edition 1 | 1. Baskı: 500 copies | adet

Prepared for Publication | Yayına Hazırlayan  
Filiz Yenişehirlioğlu

Editors | Editörler  
Defne Karakaya (Turkish | Türkçe), Timothy Glenn Little (English | İngilizce)

Copy Editors | Redaktörler  
Arzu Beril Kırcı, Mehtap Türkyılmaz

Cover Image | Kapak Görseli  
“Milet” type Ottoman Ceramic, found in Edirne Zindanaltı Sur Excavations in 2009,  
Late 14<sup>th</sup>- Early 15<sup>th</sup> Century, Inventory number: 2010/6 E, Edirne Museum.  
Edirne Zindanaltı Sur Kazı’sında 2009 yılında bulunan “Milet Tipi” Osmanlı Seramiği,  
14. yüzyıl sonu-15. yüzyıl başı, Envanter numarası 2010/6 E, Edirne Müzesi.  
Photograph by | Fotoğraf: Gülgün Yılmaz

All rights reserved. No parts of this publication may be reproduced. No quotations are allowed without citing.  
It may not be published in any form or by any means, electronic, mechanical, photo-copying or otherwise  
without the prior permission of Koç University VEKAM.  
Her hakkı mahfuzdur. Bu yayının hiçbir bölümü kopya edilemez. Kaynak göstermeden alıntı yapılamaz. Koç  
Üniversitesi VEKAM’ın izni olmadan elektronik, mekanik, fotokopi ve benzeri yollarla kopya edilip yayımlanamaz.

Design | Tasarım: Barek  
www.barek.com.tr

Print | Basım: Dumat Ofset  
Bahçekapı Mh. 2477. Sk. No: 6 Şaşmaz, Etimesgut, Ankara T. (312) 278 82 00  
dumat@dumat.com.tr

Koç Üniversitesi VEKAM  
Vehbi Koç Ankara Araştırmaları Uygulama ve Araştırma Merkezi  
Pınarbaşı Mahallesi, Şehit Hakan Turan Sokak, No: 9, Keçiören 06290 Ankara  
T. (312) 355 20 27 F. (312) 356 33 94  
vekam.ku.edu.tr

VEKAM Yayın No: 42



## THE EARLY TURKISH POTTERY PRODUCTIONS IN WESTERN ANATOLIA: PROVENANCES, CONTEXTUALIZATION AND TECHNIQUES

---

**Jacques BURLOT**

Université Lyon 2 & UMR 5138, Maison de l'Orient et de la Méditerranée, France

**Sylvie Yona WAKSMAN**

Centre National de la Recherche Scientifique, UMR 5138, Maison de l'Orient et de la Méditerranée, France

**Beate BÖHLENDORF-ARSLAN**

Marburg University, Christian Archaeology and Byzantine Art History, Germany

**Joanita VROOM**

Leiden University, Faculty of Archaeology, The Netherlands

**Sarah JAPP**

Deutsches Archäologisches Institut, Germany

**Iryna TESLENKO**

Institute of Archaeology, National Ukrainian Academy of Science, Ukraine

### **Résumé**

*Cet article est une courte synthèse de notre étude des productions céramiques à la transition entre périodes byzantine et turque dans l'Ouest anatolien. Des analyses archéométriques associées aux données archéologiques ont permis de définir des productions, parfois localisées, et d'observer l'apparition de nouveaux types locaux avec l'installation des premières populations turques. L'étude des éléments de décor a permis de caractériser leurs techniques de fabrication, et de montrer que bien que la tradition byzantine locale (glaçure plombifère reposant sur un engobe argileux) soit toujours observée avec les sgraffitos polychromes et les céramiques à décor moulé, de nouvelles recettes sont utilisées pour les céramiques à glaçure turquoise et pour les «Miletus Ware», avec l'apparition de glaçures alcalino-plombifères. Pour ce qui est des engobes, ils deviennent synthétiques avec les «Miletus Ware», préfigurant ainsi les productions plus tardives d'Iznik.*

The late 13<sup>th</sup> to the early 15<sup>th</sup> centuries correspond in western Anatolia to the transition between the Byzantine and the Turkish (Beylik and Ottoman) periods. The arrival of Turkish populations is correlated with the production of new ceramics types in the region, such as the ones discovered in the five Turkish and three Crimean sites of our study (fig. 1). Among these types appear some specific Polychrome Sgraffito Wares - with petals incised on the interior of the vessel, painted purple-brown dots and green or orange stripes, Moulded Wares, Turquoise Glazed Wares, and the so-called "Miletus Wares" (fig. 2).

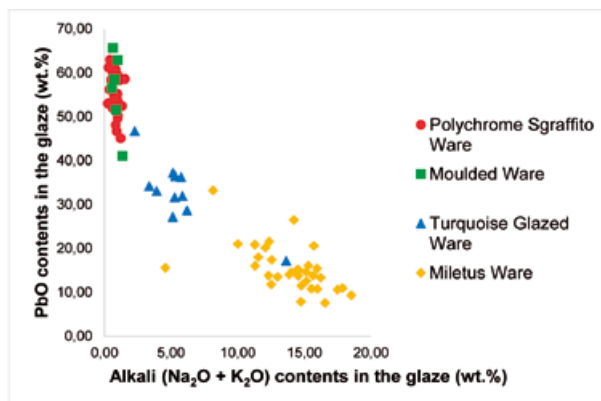
Archaeometric analyses were carried out in Lyon on the ceramics bodies, slips and glazes. Chemical analysis by X-ray fluorescence of the bodies enabled us to define the productions corresponding to these new types of ceramics and sometimes to local-

ize their workshops. The techniques of manufacture of these new productions were then defined, thanks to analyses of the slips and glazes carried out using a scanning electron microscope (Sauer and Waksman, 2005; Waksman, 2014; Waksman Burlot, Böhlendorf-Arslan and Vroom, 2017; Burlot, Waksman, Böhlendorf-Arslan and Vroom, forthcoming; Burlot and Waksman, forthcoming).

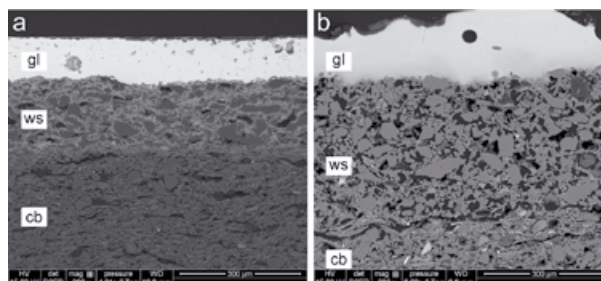
The type of Polychrome Sgraffito Wares we considered, for which we have a well dated context in Pergamon with a *terminus post quem* at the end of the 14<sup>th</sup> century (Böhlendorf-Arslan, 2004), was produced in four different production centres. Two of them are localized, in Ephesus and Miletus (Sauer and Waksman, 2005; Waksman, 2014; Burlot *et al.*, forthcoming). Analyses of the coatings have shown that the glazes are transparent and of "high lead" type, regardless of



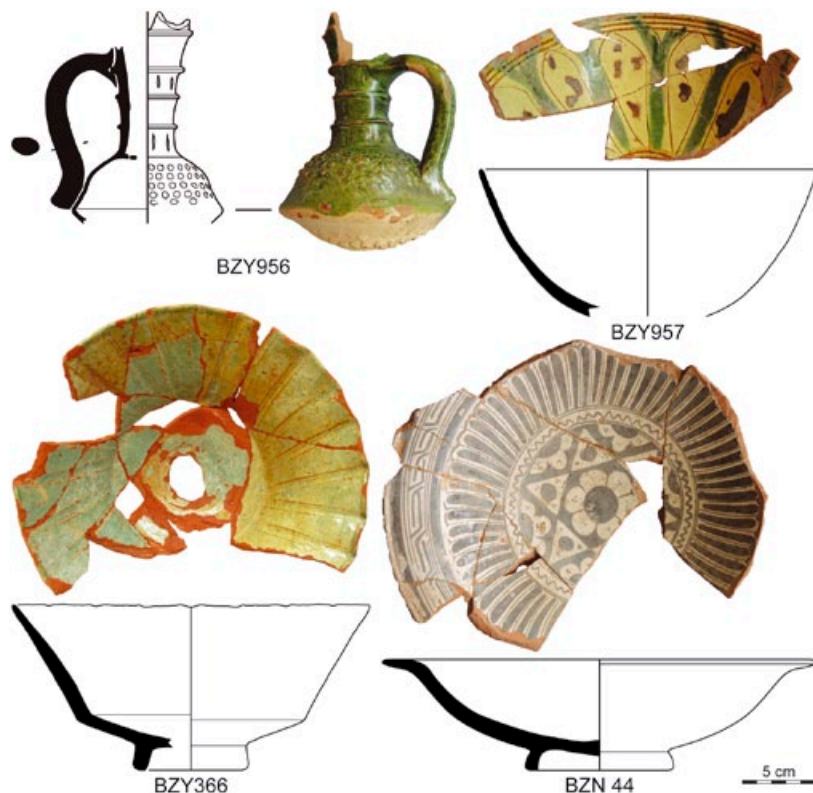
**Fig. 1** Location of the archaeological sites and sampling considered. The types investigated in each sites are indicated, together with their status (local stricto sensu or not) (DAO: J. Burlot).



**Fig. 3** Binary plot showing PbO contents vs. alkali contents ( $\text{Na}_2\text{O} + \text{K}_2\text{O}$ ) in the glazes.



**Fig. 4** SEM images in backscattered electron mode (chemical contrast): a) cross section showing a glazed ceramic with a clayey slip; b) cross section showing a "Miletus Ware" with a "synthetic" slip. gl: glaze; ws: white slip; cb: ceramic body (Pictures: J. Burlot).



**Fig. 2** Typical examples of the four ceramic types investigated (scale: 1/5): Moulded Ware (BZY956), Polychrome Sgraffito Ware (BZY957), Turquoise Glazed Ware (BZY366) and "Miletus Ware" (BZN 44) (Pictures: S.Y. Waksman; Drawings: S.Y. Waksman, J. Vroom, B. Böhlendorf-Arslan; DAO: J. Burlot)

their production sites (fig. 3). The green stripes are obtained by addition of copper oxides; the yellow to orange stripes by addition of iron oxides. The purple-brown dots are obtained by using manganese oxides. As for the slips, the observation of their microstructure and chemical analyses show that all Polychrome Sgraffito Wares contain clayey materials rich in siliceous inclusions (fig. 4 a).

Concerning the Moulded Wares and the Turquoise Glazed Wares, even though we have no contexts which would enable us to precisely date these types, they seem to have appeared with the arrival of the first Turkish populations (Vroom, 2005; Böhlendorf-Arslan, 2008; Vroom and Fındık, 2015). In western Anatolia, we identified several productions of Moulded Wares, including two in Ephesus and Miletus (Waksman *et al.*, 2017). As for their glazes and slips, the same trends can be observed for the Polychrome Sgraffito Wares, because their glazes are transparent and of “high lead type” (fig. 3) and the slips are made of clay with a high amount of siliceous inclusions (fig. 4 a). These ceramics feature green glazes, a colour obtained by adding copper oxides to the glaze mixture.

The Turquoise Glazed Wares seem to have been produced in different centers in western Turkey, but up till now the two productions that have been defined cannot be accurately localized (Waksman, 2014). They seem to come from the Ephesus and Pergamon regions, but further investigations are necessary to confirm these hypotheses. With the turquoise glaze, we observe a new production recipe. It features less lead oxide and more sodium oxide as new flux (fig. 3). The introduction of the turquoise colour is related to this new flux, as it results from the presence of copper oxides in a lead-alkali glaze. In addition, turquoise glazes are not transparent, but opaque. This opacity results from cassiterite (tin dioxide) inclusions present in the glaze. Even though we have in this case a different type of glaze, the slips are still of clayey type rich in siliceous inclusions (fig. 4 a).

The so-called “Miletus Wares” are considered to be one of the first types of ceramics manufactured by the Ottomans. It is commonly admitted that they are widely diffused in Turkey since the second half of the 14<sup>th</sup> century (Aslanapa, Yetkin and Altun, 1989). However, “Miletus Wares” were discovered in different Crimean sites, in stratified levels mostly dated from the second half of the 15<sup>th</sup> century, going up to the end of the 16<sup>th</sup> century for some of them, which is the latest occurrence known for these ceramics (Teslenko, 2007). Our samples of “Miletus Wares” come from three productions, different from those corresponding to the previous ceramic types. One is located in

Iznik, whose wares were exported to the Crimea as shown by our samples; another one corresponds to a workshop discovered in reoccupation levels of the Red Hall in Pergamon (Mania, 2006) and the third has not yet been localized. The latter includes examples found in Ephesus, Miletus, and Sardis (Burlot and Waksman, forthcoming).

No matter the production group, glazes covering painted decorations contain less lead, but are rich in alkalis, especially sodium with an average amount of 15 wt.% (fig. 3). These glazes are transparent and, given their much wider chromatic panel, a large variety of colouring agents were used. The deep blue shade colour is obtained through the use of cobalt, purple through manganese and black through chromite. The “Miletus Wares” from Pergamon are still covered by a slip made out of clay rich in siliceous inclusions (fig. 4 a). But the slip covering the ceramics of the two other groups is totally different since it is no longer clay-based, but is mostly made out of ground quartz grains, bound together by a vitreous phase and a small amount of clay (fig. 4 b).

The association of archaeometric and archaeological data enabled us to define some of the first Turkish pottery productions in western Anatolia. For instance, we could define three productions of “Miletus Wares”, one of which was manufactured in Iznik and still found in the Crimea until the end of the 16<sup>th</sup> century. Two of these productions have very similar stylistical and technical features.

As for the decoration, the glazes and slips of Polychrome Sgraffito Wares and Moulded Wares still follow the Byzantine tradition with high lead glazes and clayey slips. This is not the case for Turquoise Glazed Wares, whose glaze is obtained by the addition of copper in a lead-alkali glazing mixture. The “Miletus Wares” glazes are also of lead-alkali type, and these wares feature a “synthetic” slip, which prefigure the stonepastes of later Iznik productions.

### Acknowledgements

This study was funded by the French National Research Agency (ANR) through the POMEDOR project, and we acknowledge the support of the ANR under reference ANR-12-CULT-0008. We would like to thank the respective Directors of excavations and of museums and the Ministry of Culture and Tourism for permissions to study this material.

## REFERENCES

- Aslanapa, O., Yetkin, S. and Altun, A. (1989). *The Iznik Tile Kiln Excavations (the Second Round: 1981-1988)*. İstanbul: The Historical Research Foundation.
- Böhlendorf-Arslan, B. (2004). *Glasierte byzantinische Keramik aus der Türkei*. İstanbul: Ege Yayınları.
- Böhlendorf-Arslan, B., (2008). Keramikproduktion im byzantinischen und türkischen Milet. *Istanbuler Mitteilungen*, 58, 371-407.
- Burlot, J. and Waksman, S.Y. (forthcoming). "Miletus Ware" revisited: the transition from Byzantine to Ottoman Pottery in Western Anatolia.
- Burlot, J., Waksman, S.Y., Böhlendorf-Arslan, B. and Vroom, J. (forthcoming). Changing People, Dining Habits and Pottery Technologies: Tablewares Productions on the Eve of the Ottoman Empire in Western Anatolia. S.Y. Waksman (Ed.). *Multidisciplinary Approaches to Food and Foodways in the Medieval Eastern Mediterranean*.
- Mania, U. (2006). Eine neue Werkstatt früher türkischer Keramik – Miletware aus Pergamon. *Istanbuler Mitteilungen*, 56, 475-501.
- Sauer, R., and Waksman, S.Y. (2005). Laboratory investigations of selected medieval sherds from the Artemision in Ephesus. F. Krinzinger (Dir). *Spätantike und Mittelalterliche Keramik aus Ephesos* (Archäologische Forschungen, Band 13) (pp.51-66). Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- Teslenko, I. (2007). Turkish ceramics in the Crimea on the eve of the Porta invasion. S.Y. Waksman (Ed.). *Archaeometric and Archaeological Approaches to Ceramics, Papers presented at EMAC'05, 8<sup>th</sup> European Meeting on Ancient Ceramics, Lyon 2005* (BAR International Series S1691) (pp.187-193). Oxford: Archaeopress.
- Vroom, J. (2005). Medieval pottery from the Artemision in Ephesus: Imports and locally produced wares. F. Krinzinger (Dir). *Spätantike und Mittelalterliche Keramik aus Ephesos* (Archäologische Forschungen, Band 13) (pp.17-49). Wien: Verlag der Österreichischen Akademie der Wissenschaften.
- Vroom, J. and Fındık, E. (2015). The pottery finds. S. Ladstätter (Dir). *Die Türbe im Artemision: Ein frühosmanischer Grabbau in Ayasuluk/Selçuk und sein kulturhistorisches Umfeld* (Sonderschriften Band 53) (pp.205-292). Wien, Österreichisches Archäologisches Institut.
- Waksman, S.Y. (2014). Long-term pottery production and chemical reference groups: examples from Medieval Western Turkey. H. Meyza, K. Domzalski (Eds.). *Late Hellenistic to Mediaeval fine wares of the Aegean coast of Anatolia. Their production, imitation and use* (pp.107-125). Varsovie, Neriton.
- Waksman, S.Y., Burlot, J., Böhlendorf-Arslan, B. and Vroom, J. (2015). Moulded wares production in the Early Turkish/Beylik period in Western Anatolia: A case study from Ephesus and Miletus. *Journal of Archaeological Science: Reports*, doi:10.1016/j.jasrep.2015.11.015.