

The Big Five. Mapping the subsurface of Iron Age forts on the Island of Öland, Sweden

Andreas Viberg^a

KEY-WORDS: ring-fort, Iron Age, Öland, Sweden, ground-penetrating radar, MIRA, magnetometer

INTRODUCTION

The island of Öland in the Baltic Sea is home to several large ring-forts dated to about AD 200–700 (Fig. 1). Eighteen ring-forts are known from historical maps and records, but only 15 have been preserved. Only one of these forts, Eketorp, was subject to large-scale archaeological investigations and the fort was completely excavated in 1964–74 (Borg *et al.* 1976). During the

^a Archaeological Research Laboratory, Department of Archaeology and Classical Studies, Stockholm University, Stockholm, Sweden

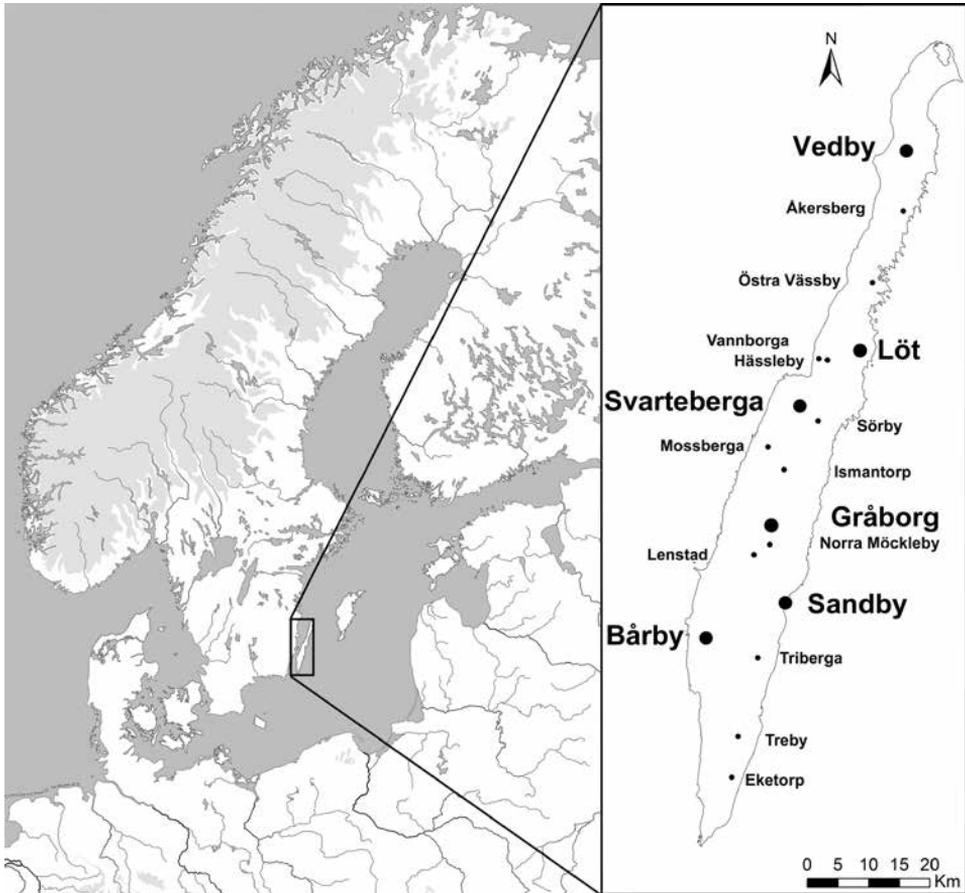


Fig. 1. Map of the island of Öland, on the east coast of Sweden, and the location of its ring-forts

excavations some 53 stone house foundations were discovered inside the fort (Fig. 2) and surveys and archaeological testing have confirmed the existence of similar foundations in at least ten other forts on the island (Fallgren 2008). Since Eketorp is the only completely excavated ring-fort, it is seen as a model for all the other Ölandic forts, despite the fact that the other forts may have held different functions. Several ring-forts are also too large for traditional archaeological excavations and as a consequence little is known about them. Many forts, at least since the beginning of the 17th century (e.g., Tegnér 2008: 44), were subject to intensive agricultural activity, which may have had a detrimental effect on the preservation of archaeological remains.

“The Big Five” is a project funded by the Swedish research council and the Royal Academy of Letters History and Antiquities to use geophysical prospection methods in the investigation of five of these ring-forts: Gråborg, Vedby borg, Bårby borg, Löts borg and Svarteberga borg. The purpose of the surveys is to nuance the picture of the Ölandic forts by providing new

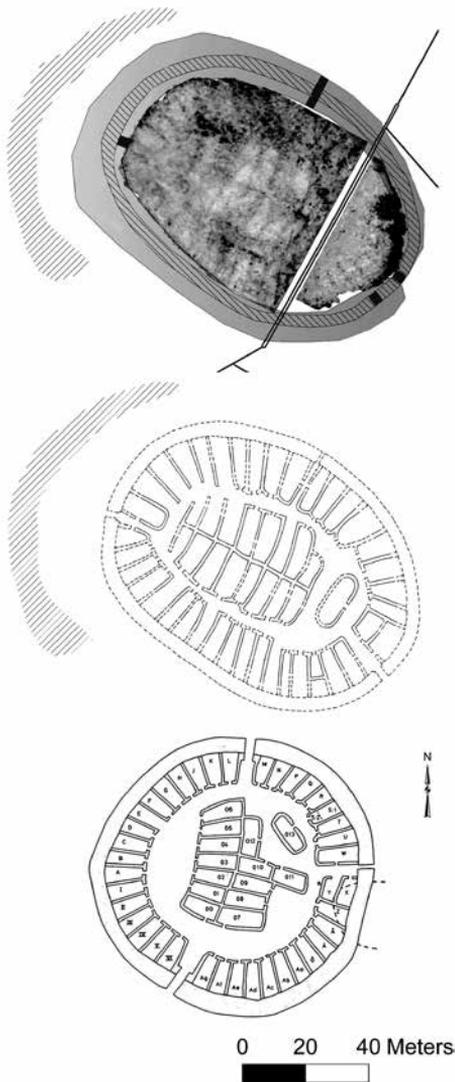


Fig. 2. GPR results from Sandby borg: top, GPR depth-slice of 2 ns thickness at a depth 15 cm below the surface; middle, interpretation of the GPR results from Sandby borg showing multiple Iron Age house foundations inside the fort; bottom, spatial layout of the already excavated Ölandic ring-fort Eketorp II (Borg *et al.* 1976)

information regarding any preserved remains buried in the forts. An underlying purpose is also to evaluate the deleterious impact of earlier agricultural activity.

The forts will be surveyed using the motorised ground-penetrating radar (GPR) system MIRA (MALÅ imaging radar array). This system can be used to survey large areas at high speed and collect high-resolution data without affecting the buried remains below ground and has been tested successfully in Sweden before (e.g., Trinks *et al.* 2010; Trinks and Biwall 2011; Trinks *et al.* 2013). The GPR measurements will be complemented by magnetometer surveys in selected areas and also include mobile mapping system (MMS) documentation using the GeoTracker at Gråborg and Vedby borg (see Viberg and Larson: 396-399 in this volume). The geophysical results would advance our understanding of these forts by providing information regarding their spatial layout and by identifying different activity areas. This information can be used for 3D reconstructions and provide archaeologists with detailed maps of the subsurface, which can enable future targeted excavations.

FEASIBILITY STUDY AT SANDBY BORG, ÖLAND

For the purpose of testing the suitability of the proposed methods, a feasibility study was carried out at one of the Ölandic forts. Sandby borg (RAÄ 45:1) is situated in the parish of Sandby on the eastern coast of Öland and is the only fort situated close to the sea (Fig. 1). The quaternary deposits in the area are dominated by outcrops of outwash gravels overlying very shallow limestone bedrock. The fort is oval in shape with an inner area of approximately 95 m by 64 m (about 5140 m²), as measured from exposed parts of the original dry wall. Compared to other ring-



Fig. 3. Measurements with the MIRA system outside the northwestern gate at Gråborg, Sweden. (Photo: Magnus Larson 2014)

forts proposed in the project, Sandby borg is quite small. Aerial photographs from the 1970s showed faint traces of buried structures within the fort and a geophysical survey was carried out to map these remains and to produce a spatial layout of the fort.

The survey was carried out in 2010–2011 and included a single GPR antenna of the X3M-system by MALÅ Geoscience, collecting data with a sampling density of 0.03m by 0.25 m.

The GPR results provide clear evidence of buried stone house foundations, similar to what was located in Eketorp during the excavations in the 1970s (Fig. 2). An interpretation of the data along with the excavation results from the second phase at Eketorp show great similarities (Fig. 2). Subsequent excavations, carried out by the Kalmar County Museum in 2011, provided archaeological evidence of the high accuracy and resolution of the geophysical measurements and the geophysical maps proved to be a valuable asset when planning strategies for the excavation campaign (Viberg *et al.* 2014). The results clearly show the suitability of geophysical prospection methods on structures found within the forts.

2014 FIELD SURVEY CAMPAIGN

The first field campaign was carried out in May 2014 during which time MIRA data were collected at the forts in Vedby, Löt and Bårby (Fig. 3). Several test profiles were also surveyed at Bårby borg, using the new MALÅ GX HDR antenna (160 MHz), in order, to study the bedrock

under the fort. Additionally, the inside and 1.3 ha outside the largest ring-fort at Gråborg was surveyed. These measurements will be complemented by additional GPR and magnetic surveys during the coming years. In addition to the previously mentioned forts, surveys will be carried out in 2015 at two smaller forts, Hässleby borg and Triberga borg. The data from the Ölandic fort sites can then be used to revitalize and nuance the archaeological discussion and understanding of the Ölandic forts, their interior design, their relationship to the surrounding landscape and to one another.

ACKNOWLEDGEMENTS

I would like to thank the Swedish Research Council and the Swedish Royal Academy of Letters, History and Antiquities for financial support. Thanks are due to Karl-Oskar Erlandsson, Robert Danielsson, Börje Karlsson, Christer Gustafsson (MALÅ Geoscience), Magnus Larson (WSP), Kerstin Persson, Aina Sevelin and the Swedish National Heritage Board for permissions and fieldwork support. I am especially grateful to Dean Goodman in processing the Sandby borg GPR data.

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