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Bogas - *Boops boops* (LINNAEUS, 1758) – from the Biscay to the North Sea in 2500 BC and 1980 AD

Bogas - Boops boops (LINNAEUS, 1758) – desde Bizkaia al Mar del Norte en 2500 BC y 1980 AD

KEY WORDS: Bogue, *Boops boops* (LINNAEUS, 1758), breeding population, North Sea, Neolithic, shell deposits, warm climate, structured deposition, red ochre.

PALABRAS CLAVE: Boga, *Boops boops* (LINNAEUS, 1758), población reproductora, Mar del Norte, Neolítico, depósito de conchas, clima húmedo, depósitos estructurados, ocre rojo.

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ABSTRACT

The finds of the sparid fish bogue (*Boops boops*) in Swedish Neolithic shellmiddens are reported. Size distribution of the fishes found indicates that bogue had established a breeding population in the North Sea at this time period. Sea temperatures were higher than today. The catching of bogue indicates use of nets or traps. Renewed excavations at old midden sites and at new sites indicate that shellmiddens were intentional, ritual structures rather than ordinary rubbish heaps. The need for broad comparative collections and the integration of the archaeozoologist in excavations is stressed.

RESUMEN

Se presentan los hallazgos del pez espárido boga (*Boops boops*) en los concheros neolíticos de Suecia. La distribución de los tamaños de los peces hallados indica que existía en el Mar del Norte en este período una población reproductora. Las temperaturas del mar eran más altas que hoy. La pesca de la boga indica el uso de redes u otras artes de pesca. Las excavaciones recientes en yacimientos tanto antiguos como nuevos indican que los concheros son intencionales, es decir, estructuras rituales más que amontonamientos comunes. Se subraya la necesidad de nuevas colecciones comparativas y la integración de arqueozoólogos en las excavaciones.

LABURPENA

Suediako maskor pilaketa neolitikoa aurkitutako boga arrain esparidoa (*Boops boops*) aurkezten da. Arrain horien tamainaren arabera banaketak adierazten duenez, garai hartan bazegoen boga arraina ugaltzen zuen populazio bat Ipar Itsasoan. Itsasoaren temperatura egungo baino epelagoa zen. Bogaren arrantzak sareak edo artea erabiltzen zituztela adierazten du. Antzinako maskor-pilaketetan egin berri diren indusketek eta aurkitutako hobi berriek borondatez egindako pilaketak direla erakusten dute, hau da, multzo erritualak direla eta ez hondakin normalen pilaketak. Pilaketa gehiago konparatu beharra azpimarratu da, hala nola indusketetara arkeozoologoak gehitu beharra.

The study of material from Neolithic shell deposits in Sweden has long been an almost neglected field of research. Still there was an early find of such a deposit. In 1905 a Neolithic "kitchen midden" was found and partly excavated at Ånneröd in northernmost part of the Swedish west coast (FRÖDIN 1907). A zoological analysis was performed but never published except a preliminary list of species. Thirty years later a new find of a Neolithic midden was made at Rörvik 45 km to the south and most of it was excavated, but only brief results were published (JANSSON 1936, HENRICI 1936). The zoological investigations of the

materials from these deposits were hampered by the lack of adequate osteological reference collections and experience respectively. Recently AMS-datings of the sites has given them an age of around 2500 years BC (calibrated) (JONSSON, in prep.).

In 1979/1980 we unexpectedly got the opportunity to reinvestigate the site at Ånneröd. This led us to take a new look at the bones from the first excavation. Fish were dominating in all find units and cod (*Gadus morhua*) and mackerel (*Scomber scombrus*) were the most common species. MACKEREL had been identified but not

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published from the older excavation. But there was another fish species in the old excavation that had been sorted out but not identified. We found the same species in our investigation and we could at first not identify it to species. It seemed to be a sea bream (family *Sparidae*) and tooth sockets in premaxillaries and dentaries indicated that the only likely candidates would be the bouge (*Boops boops*) or the saupe (*Sarpa salpa*). None of these species were available in the osteological collection of the Gothenburg Museum of Natural History or any other Swedish collection. The Zoological Museum of the University in Copenhagen had dried articulated vertebral columns of both taxa and it could be decided that our finds belonged to *Boops*, Boga in Spanish. This species is presently distributed from the Bay Biscay, south to Angola, in the Mediterranean and the Black Sea, and in the Gulf of Mexico and West Indies (WHITEHEAD *et al.* 1986). Breeding has not been reported north of the Biscay, and larvae and young of the year have not been reported east of the English Channel. The bogue is a shoaling fish that lives in inshore waters. During the night they are moving to the surface. The adults are mostly herbivorous and take algae, sponges and encrusted animals, but also isopods and amphipods. The young feed on planktonic crustaceans in open water until they in their first year at 10 cm length move inshore. Sexual maturity occurs at around 16 cm length in the second year. The bogue is hermaphroditic (generally protogynous). Spawning takes place at different times of the year depending on temperature. On the Atlantic coast of Europe the bogue spawns from March to May (WHEELER 1969, WHITEHEAD *et al.* 1986).

To be able to continue the identification of the bones of *Boops* we had to have our own specimens of this fish. Fortunately I had met JESUS ALTUNA at an ICAZ conference in Poland in 1978 and I sent a request to him for "bogas" and he promptly sent me two specimens (figure 1). This enabled us to identify all the sparid bones from the midden. Later the other European sparid species and the closely related centrarchids (*Spicara* spp.) have been included in the reference collection, but none of the identifications was changed.

The identification of *Boops* from the site Ånneröd has given us new and unexpected information on both the fishing methods used by Neolithic people and the environmental conditions in the sea. Not only could it be seen that *Boops* was frequently caught, but the size distribution of the vertebrae found during the most recent excavation revealed that all age classes were represented, including less than 1 year (figure 2).

The presence of *Boops* so far north is exceptional. There have only been stray finds of this species in the North Sea during the last century, and all finds are of old individuals. The presence of young specimens (around 6 months old) clearly indicates that *Boops* was present in the North Sea as a breeding population for some time during Early Subboreal period. The sea must have been warm enough even in the winter to allow for this fish to survive all year round. The spawning season was probably 1 or 2 months later at these northern latitudes than we find in e.g. in Bay of Biscay today.

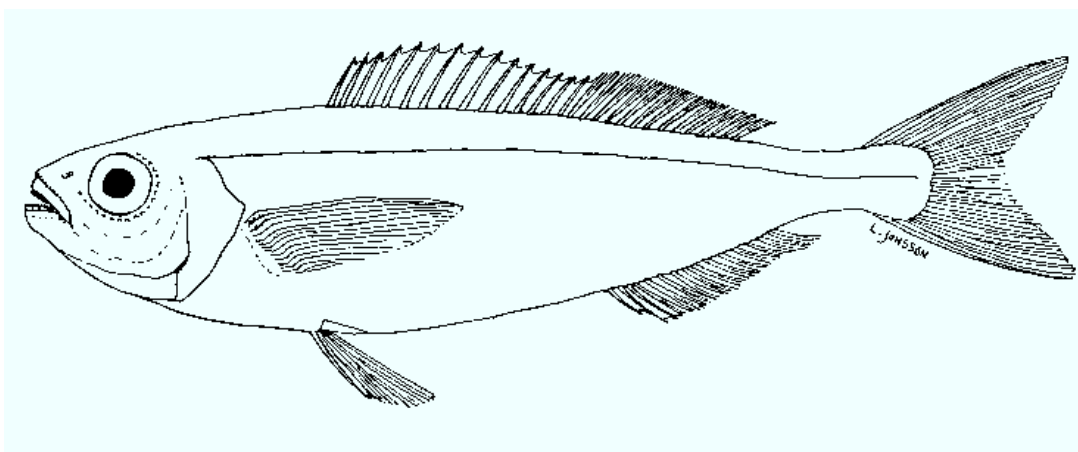


Figure 1. The bogue (*Boops boops*) illustrated from a specimen collected by JESUS ALTUNA in San Sebastian, July 1980, total length 155 mm.

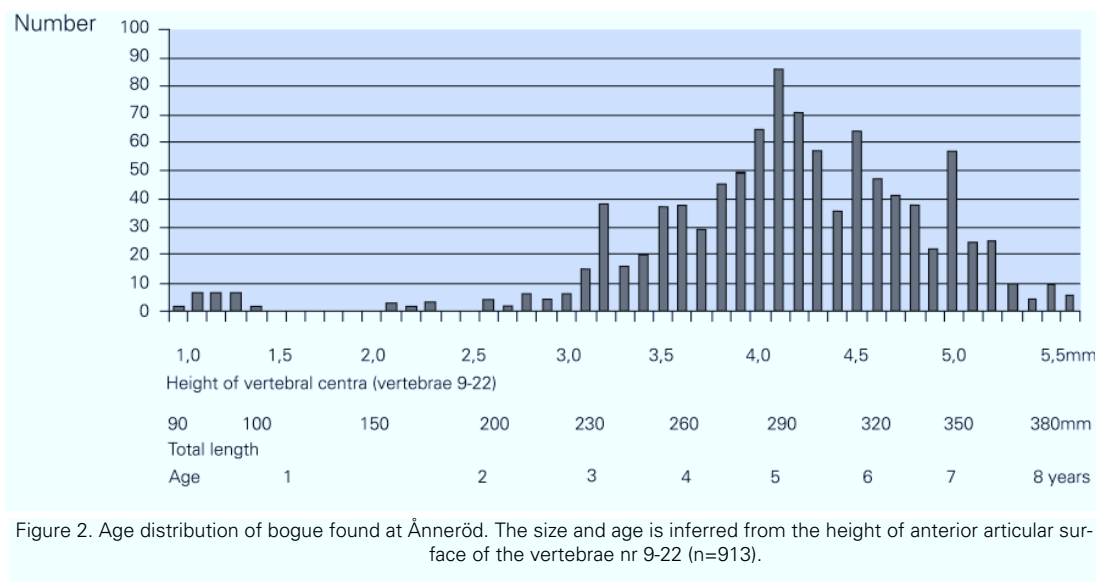


Figure 2. Age distribution of bogue found at Ånneröd. The size and age is inferred from the height of anterior articular surface of the vertebrae nr 9-22 (n=913).

Another conclusion is that the Neolithic inhabitants were fishing with nets or forms large traps because it seems unlikely that they took *Boops* on hooks as they did with fishes of the cod family (GADIDAE). Hooks were found but no direct or indirect finds of nets (e.g. net sinkers) have been made so far.

In 2003 a new find of a Neolithic shell deposit was made at Sandhem only 7 km south of Ånneröd. So far only small areas (1x1 m test squares) have been excavated and the site bears many resemblances to Ånneröd. At Sandhem *Boops* is the most common species identified. Soil samples have not been floatated yet so we don't know if the youngest year classes are present here too, but it seems likely that they do.

At Sandhem it was possible for the archaeozoologist to do observations of the bones *in situ*. One experience from the analysis of the material from Ånneröd was that prehistoric deposits of shells and bones should not be regarded as simple refuse heaps. In Ånneröd it can be shown that the ground had been coloured (initiated?) with red ochre before deposition of organic material started. There were indications of structured depositions but the documentation from 1905 was not detailed enough for firm conclusions. Therefore the excavation at Sandhem was made with the possibility in mind of finding such structures. But the structures we sought for were

not expected to be observed by the ordinary archaeologist. There had to be a faunal expert on the site to identify bones and shells still *in situ*. In this way we were able to define discrete depositional events, each with its own faunal composition and other characteristics. (A collected report on the bone finds from the Ånneröd, Rörvik, Sandhem, and other Neolithic coastal sites of western Sweden, is in preparation.)

In my work with faunal remains from prehistoric and historic sites I have often been reminded of the way professor JESUS ALTUNA takes active part, or even directs archaeological excavations in order to develop and fully integrate zoology and archaeology. Comparative osteological collections that covers all species that could possibly occur in the area of investigation is a prerequisite for a proper analysis of prehistoric bones, and the collection created by professor JESUS ALTUNA and his wife KORO MARIEZKURRENA in San Sebastian is a remarkable effort and inspiration to us all.

ACKNOWLEDGEMENT

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