

縄文時代の植物利用に関する年代研究

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はじめに

平成20年度新研究創成経費（年代測定総合研究センター内若手教員・非常勤研究員の研究の競争的経費）に採択された「縄文時代の植物利用に関する年代研究」は、2008年6月29日～2008年7月5日にアイルランドのダブリンで開催された、第6回世界考古学会議（Sixth World Archaeological Congress）における研究発表にかかる経費の一部として採択されたものである。申請者は、第6回世界考古学会議の"Wetland Archaeology Across the World"というテーマのセッションの一つである、"Wetland dwellings and settlements: living in wet environments I"において以下の題目で研究発表を行った。

Yuichiro Kudo : Plant utilization during the second half of the Jomon period detected from wetland sites in central Japan

上記の研究発表内容の概要について報告する。

Introduction

The 'Jomon period' is known as the period of prehistoric hunter-gatherer-fishers of the Japanese islands and has been generally distinguished from the late Paleolithic on the basis of the production and utilization of pottery. The Jomon period is also used to indicate the period prior to the beginning of rice agriculture (Yayoi Period). This period (ca. 15,500 - 2,500 cal BP) has been subdivided by the pottery typology into the Incipient (ca. 15,500-), Earliest (ca. 11,500-), Early (7,300-), Middle (5,500-), Late (4,400-) and Final (ca. 3,200 - 2,500 cal BP) subperiods. Utilization of the pottery, adaptation to marine life, year round sedentary settlement, complex social organization and highly developed plant utilization have characterized this culture.

Plant utilization of the Jomon Period

Prehistoric hunter-gatherers of the Jomon period utilized a wide variety of wild animals, wild plants, freshwater fishes, and marine resources for the diet according to the seasons. Major plant foods commonly utilized during the Jomon period were various nuts of chestnuts (*Castanea crenata*), horse chestnut (*Aesculus turbinata*), acorns (*Quercus* species, *Castanopsis* species) and

walnut (*Juglans mandshurica*).

Chestnuts (*Castanea crenata*) were most commonly used for diet during the Jomon period in the eastern part of Japanese islands, and its timber were widely used for the construction of dwellings and wetland structures since the Early Jomon period. Utilization system of chestnut during the Jomon period is one of the topics of debate. This species is never found in climax vegetation but is a component of secondary forests with such species as *Quercus serrata*, *Quercus crispula*, and *Fagus crenata* in the deciduous broadleaved forest zone. Thus, if people want to use chestnut fruits and timber intensively for food and building material, they need to collect them from a large area of secondary forests unless people manage its forests around the settlement (Suzuki, 2007). Around the Early and Middle Jomon settlements at the Sannai-Maruyama site in Aomori prefecture, pollen analyses around the settlement area indicate that the chestnut pollen obviously increased and dominated during the settlement phase (Yoshikawa et al., 2006). Such results of pollen analyses have been reported from several settlement sites in the central and northern parts of Honshu Island. Thus, it is considered that chestnut forests were managed (semi-cultivation?) around settlements in the middle and northern parts of Honshu Island after the Early Jomon period (Noshiro and Suzuki, 1997).

Highly developed plant utilization during the Jomon period has continually been demonstrated in these twenty years. This includes, besides management of chestnut resources, use of horse chestnut fruits (*Aesculus turbinata*) that require complicated processing (crushing, soaking, boiling and Neutralizing with ash), utilization of beans (*Vigna* species, *Glycine* species), hemp fruits (*Cannabis sativa*), and calabash fruits (*Lagenaria siceraria*).

Utilization of lacquer tree

On the other hand, utilization of the lacquer trees (*Rhus verniciflua* Stokes (= *Toxicodendron vernicifluum* (Stoke) F. A. Barkl.)) in the Jomon period has also attracted attentions in recent years. Lacquer is a versatile natural resin which can be used for coating, adhesion, and filling material. Six species of *Rhus*, i.e., *Rhus verniciflua*, *Rhus trichocarpa*, *Rhus ambigua*, *Rhus sylvestris*, *Rhus succedanea*, and *Rhus japonica*, grow on the Japanese islands at present. Among them, lacquer can be extracted only from *Rhus verniciflua*. At present, *Rhus verniciflua* is distributed in Japan, Korea, and China. In Japan, however, lacquer tree is not been found in natural forests but only around human settlements and is generally considered as introduced from the China. Thus, to examine the origin and history of the lacquer tree utilization in Japanese islands is an important research topic of the Japanese prehistoric archaeology.

During the Jomon period, lacquer was used for lacquered products such as lacquer coated pottery, wooden bowl, woven basket, comb, hairclip and bow, for repair of the broken pottery, and so on. The oldest remains of the lacquer artifacts are lacquered accessories (lacquered threads) found from the burial at Kakinoshima B site on the Hokkaido island, which has been dated ca. 9,000 cal BP, corresponding with earliest Jomon period (Minami-Kayabe Town archaeological research

group, 2002). After the early Jomon period, lacquer had become common items for the Jomon people.

Recently, it became possible to identify *Rhus* species by the fossil woods (Noshiro and Suzuki, 2004) and by pollen (Yoshikawa, 2006). Introduction of the lacquer tree (*Rhus verniciflua*) to Japan seems to be traced to the Incipient Jomon period (ca. 13,000 cal BP) at this moment (Noshiro et al., 2007).

Lacquer artifacts and lacquer timbers excavated at the Shimo-yakebe site

Recent progress of the wetland archaeology revealed a detailed picture of the plant utilization of prehistoric hunter-gatherers. Shimo-yakebe site is one of the most important wetland sites located on the Sayama hills of the southern part of Kanto plain, central Japan. Rescue excavation had been conducted from 1996 to 2002. This site is considered a sort of working place at the riverside. Archaeological remains showing utilization of plant resources such as wooden structures for water usage, mounds of walnut (*Juglans mandshurica*) shells, peeled seeds coat mounds of horse chestnut (*Aesculus turbinata*), many woven baskets, woven mats, a lot of lacquer artifacts, and huge amounts of Jomon potteries and stone tools were excavated from the lowland area and the old river channel (Shimo-yakebe site research group, 2006; Sasaki et al., 2007). The types of Jomon pottery excavated with these remains and the radiocarbon dates showed that these archaeological remains were made during ca. 5,300–2,800 cal BP, from the Middle Jomon to the Final Jomon period (Kudo et al., 2007b).

A lot of lacquer artifacts such as lacquer potteries, wooden bowls, combs, hairclip, bows, pallet, container of the lacquer liquid and wooden stakes of lacquer tree demonstrate a highly developed use of lacquer, had been excavated at the Shimo-yakebe site. Especially, most important wooden remains are a number of the lacquer stakes with a few scars running almost around the circumference which were excavated from the No.1 row of wooden stakes (Noshiro et al., 2007).

The No.1 row of wooden stakes consists of ca. 1,000 wooden stakes in the old river channel of the Late Jomon period. Among these stakes, ca. 500 woods were identified by Dr. Noshiro. The result shows that 66 stakes of them were *Rhus verniciflua* and among them, 47 of the *Rhus verniciflua* stakes had some scars, it has 3-27 tree rings (Noshiro and Sasaki, 2007).

These stakes have one to four scars ca. 15 cm apart vertically on average. These scars could be black lines of lacquer. It could be the evidence that Jomon people of the Shimo-yakebe site extracted raw lacquer from lacquer trees around this site. These lacquer woods with scars found at the Shimo-yakebe site were the first records of actual lacquer collection in the Jomon period.

Radiocarbon dating of ten lacquer timbers with scars showed that these rows of stakes were made during ca. 4,000 to 3,600 cal BP (Kudo, 2007), corresponding with Horinoichi pottery-type phase and Kasori-B pottery phase of the Late Jomon period (Kudo et al., 2007a). In this phase, human activity seemed to be the most active because a huge amount of archaeological remains including a lot of lacquer artifacts had been excavated from this phase.

These lacquer stake remains indicate that the lacquer trees had certainly grown around the Shimo-yakebe site during Late Jomon period. On the upland area around the Shimo-yakebe site, lacquer trees seemed to be maintained (cultivated?) by the Jomon people. Abundance of the lacquer artifacts and these lacquer stakes showed that Jomon people had a systematic utilization system of the lacquer tree.

Lacquer working was conducted around the lowland area to make lacquer products. Lacquer trees were cut off after the extraction of lacquer. These lacquer trees were also used for building riverside or other structures in the lowland of the Shimo-yakebe site.

These plant remains demonstrate that the hunter-gatherers of the Jomon period had highly developed plant utilization techniques.

It is quite important to demonstrate how the prehistoric hunter-gatherers of the Jomon period had utilized and managed a variety of plant resources.

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Reference

- Kudo, Y. 2007. Wooden stakes of *Toxicodendron vernicifluum* excavated at the Shimo-yakebe site and their radiocarbon dating. *Japanese Journal of Historical Botany*, 15, 18.(in Japanese)
- Kudo, Y. Kobayashi, K. Samkamoto, M. and Matsuzaki, H. 2007a Analysis of radiocarbon dates at Shimoyakebe site: A case study of the charred residue and lacquer-coat on Jomon potteries during the Late to Latest Jomon period. *Quarterly of Archaeological Studies*, 53-4, 56-76. (in Japanese with English abstract)
- Kudo, Y. Sasaki, Y. Sakamoto, M. Kobayashi, K. and Matsuzaki, H. 2007b. A chronological study of archaeological remains showing plant utilization during the second half of the Jomon period. *Japanese Journal of Historical Botany*, 15, 5-17. (in Japanese with English abstract)
- Minami-Kayabe town Archaeological Research Group. 2002. Kakinoshima B site. 120pp. Minami-Kayabe Town Archaeological Research Group, Minami-Kayabe.
- Noshiro, S. and Suzuki, M. 2004. *Rhus verniciflua* Stokes grew in Japan since the Early Jomon period. *Japanese Journal of Historical Botany*, 12, 3-11.
- Noshiro, S. and Suzuki, M. 2006. Utilization of forest resources at the Sannai-maruyama site in Aomori Prefecture, northern Japan. *Historical Botany, Special issue 2*, 83-100.
- Noshiro, S., Suzuki, M., and Sasaki, Y. 2007. Importance of *Rhus verniciflua* Stokes (lacquer tree) in prehistoric period in Japan, deduced from identification of its fossil woods. *Vegetation*

- History and Archaeobotany, 16, 405-411.
- Noshiro, S. and Sasaki, Y. 2007. Use of timber resources at the Shimo-yakebe site, Tokyo, and its characteristics in the Kanto plain of the late to latest Jomon period. Japanese Journal of Historical Botany, 15, 19-34. (in Japanese with English abstract)
- Sasaki, Y. Kudo, Y. and Momohara, A. 2007. Utilization of plant resources reconstructed from plant macrofossils during the later half of the Jomon period at the Shimo-yakebe site. Japanese Journal of Historical Botany, 15, 35-50. (in Japanese with English abstract)
- Shimo-yakebe site research group (ed.) 2007. Shimo-yakebe site I (1). 443p, Higashi Murayama city. (in Japanese)
- Suzuki, M. and Noshiro, S. 1997. Forest Vegetation and Utilization of Wood during the Jomon Period in Japan. The Quaternary Research, 35, 329-342.
- Suzuki, M. 2002. Nihon jin to Ki no Bunka. 255p. Yasaka Shobo (in Japanese)
- Yoshikawa, M. 2006. Identification of *Rhus verniciflua* Stokes pollen and its occurrence around the Early Jomon Period in Aomori Prefecture. Japanese Journal of Historical Botany, 14, 15-27. (in Japanese with English Abstract)
- Yoshikawa, M. Suzuki, S. Tsuji, S. Goto, K. and Murata, T. 2006. Vegetation history and human activities at the Sannai-maruyama site, Aomori Prefecture. Japanese Journal of Historical Botany, Special issue 2, 49-82. (in Japanese with English Abstract)
- Yotsuyagi, K. 2006. Urushi vol. I. 252p. Hosei university press, Tokyo.

Chronological study about the plant utilization during the Jomon Period

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Abstract

Recent excavation of wetland sites during the Jomon period in Japanese islands has revealed that the hunter-gatherers had a highly developed plant utilization system. The Shimo-yakebe site in Tokyo is one of the most important wetland sites during the Middle to Final Jomon periods (ca. 5,300 – 2,800 cal BP). Two mounds of walnuts (*Juglans mandshurica*) stones, five mounds of the horse chestnut (*Aesculus turbinata*) seeds, and wooden structures for water usage made of chestnut (*Castanea crenata*) woods were found in and around sediments of the old river channel. These remains indicate multiple use of the plant resources by hunter-gatherers at that time. Lacquered wooden artifacts, lacquered pottery, and rows of wooden stake including lacquer trees (*Rhus verniciflua*) indicate systematic usage and management of the trees around the settlement.