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Re-evaluating "Jomon Farming" Based on a New Paradigm of Food Production in Human History

	Principal Investigator	The University of Tokyo, University Museum, Professor YONEDA Minoru Researcher Number : 30280712	
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Purpose and Background of the Research

Outline of the Research

Modern people rely on the field crops for much of the energy requirement. The origin of this way of life is not fully understood. Previously, the change from hunting and gathering (food acquisition) to farming (food producing) was considered a 'revolution' in human history. However, recent archaeological research has revealed that plant and animal domestication occurred all over the world over the past 10,000 years. This indicates that the onset of farming was not an 'event', but a 'phenomenon' that occurred naturally when the conditions were right. In this study, we will reconstruct the history of human-environment interaction by re-examining the Jomon period in the Japanese archipelago from the perspective of a new paradigm (Fig. 1), which regards the onset of food production as a 'phenomenon' rather than an 'event'. Specifically, we will examine the hypotheses through three research themes (Fig. 2); (1) the beginning of sedentary settlement in the Jomon period led to the evolution of wild animals and plants around villages, and that a low-level food production stage developed to manage this, and (2) this led to the establishment of a food provision that used specific plants (i.e. chestnuts and legumes) as staple foods, resulted in large settlements continued for long periods of time.



for food production

Figure 2. Structure of this project

• Background: Was farming practiced in the Jomon period?

Agriculture in Japan likely began with rice farming during the Yayoi period. However, in the Middle Jomon period, long-term settlements appeared, leading to discussions about "Jomon farming," which may have increased the population through plant cultivation and livestock raising, though no concrete evidence has been found. In the 2000s, impressions of larger beans in Jomon pottery suggested domestication of plants. Larger seeds might have evolved due to being buried in cultivated fields. although global research shows that deeper burial by animal-drawn ploughs played a role in seed evolution. Since Jomon fields or tools haven't been discovered, other reasons for larger legumes during this period must be considered.

- In West Asian zooarchaeology, co-evolution between humans and animals is gaining attention. A similar process may have occurred with Jomon legumes. The simultaneous domestication of animals and plants suggests a broad application of resource management. For the Jomon period, it's important to study plant and animal management together.
- Finally, the transition from food production to agriculture wasn't immediate. Hunting, gathering, and low-level food production coexisted for a long time. To understand the role of cultivated nuts and beans as food in the Jomon period, data like burnt residues on bones and pottery must be analyzed.

 Research Objective: The significance of agriculture and farming in human history The Jomon culture, which thrived in Japan from 16,000 to 3,000 cal. BP, is one of the most well-studied prehistoric hunter-gatherer societies. Despite relying on hunting and gathering, they enjoyed a stable and prosperous life with a complex society, yet they did not develop into a civilisation or state. This study examines Jomon culture to explore how agriculture and farming influenced the rise of civilisations and states.

Expected Research Achievements

Through two hypotheses on Jomon resource management, we examine the reality of "Jomon farming". Specifically: (A) paleoecological research analyzes isotopes in seeds, animal bones, and shells to study semi-cultivation and resource management, (B) archaeological research examines isotope ratios in pottery and carbonized bread-like products to clarify raw materials, (C) experimental archaeology explores cultivation tools, such as "chipped stone axe" and comparing with food practices in Laotian villages relying on swidden farming.

• Research Theme A: Semi-Cultivation and Resource Management

We analyze carbon and nitrogen isotopes in charred seeds to study the nutrient-rich environment created around villages. Open spaces may have led to unconscious selection around human activity, forming new human-plant relationships like semicultivation. Changes in soil will be reflected in seed isotopes. For animals, we study bones and shells to understand resource management, combining findings to trace shifts in resource strategies during the Jomon period.

- Research Theme B: Development of Staple Food
- In the previous KAKENHI project (20H00024) we have established an isotopic method on foodcrust to reconstruct cooked materials. In this study, we analyze isotopes in foodcrust to detect plant-based staple food. Combining nitrogen isotope data with trace elements, we distinguish floral types like nuts, beans, tubers and grains. By applying this method to carbonized bread-like products, we clarify staple foods. Sediment-DNA from storage pits will verify plant candidates for staples.

• Research Theme C: Validation through Ethnographic and Experimental Archaeology

We will analyze isotopes in domesticated and wild plants used by slash-and-burn farmers in Laos to explore human-plant relationships, including wild, semi-cultivated, and cultivated plants. Marks on stone axes, possibly farming tools, will be studied to verify if fields were cultivated during the Jomon period. Additionally, we will assess the 'Salmon hypothesis,' which attributes Jomon prosperity to fish resources, as a competing hypothesis to the Jomon farming hypothesis, proposing a new multidimensional model for resource management in the Jomon period.



Figure 3. Anthropogenic niche around Jomon settlement

Homepage

https://researchmap.jp/community-inf/jomon-farming Address, etc.