

YAYOI FARMERS RECONSIDERED: NEW PERSPECTIVES ON AGRICULTURAL DEVELOPMENT IN EAST ASIA

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ABSTRACT

This paper examines the characteristics of agricultural practice during the Yayoi period (300 BC-AD 250) in Japan. The paper demonstrates the discontinuity between Jomon plant cultivation and Yayoi agricultural practice, and discusses the historical significance of the beginning of Yayoi agriculture.

It has been widely accepted that, at the beginning of wet rice cultivation in Japan, a set of new agricultural technologies were introduced by immigrants from continental China and Korea. At the same time, it is also asserted that the preceding Jomon people probably developed incipient cultivation of some plants. This incipient plant cultivation is even considered to be a preliminary stage of domestication before Yayoi agriculture. Some scholars have even argued that hunter-gatherers in the Final Jomon phase played a positive role in the introduction of Yayoi agriculture since they had already become receptive to agricultural practice (Watanabe 1990:22; Kanaseki *et al.* 1995:257).

This paper reviews these interpretations and demonstrates that incipient plant cultivation during the Jomon period did not evolve into Yayoi agriculture and that Jomon hunter-gatherers did not willingly accept Yayoi agricultural methods. Rather, it was the establishment and spread of wet rice agriculture by immigrants from the continent that enabled further development of agriculture in Japan. This view will give us some clues as to why hunting and gathering lasted much longer in Hokkaido, the Ryukyu Islands and other islands in the Pacific Ocean, where wet rice cultivation began much later.

THREE STAGES IN THE DEVELOPMENT OF AGRICULTURE IN EAST ASIA

Generally speaking, three successive stages can be identified in the course of agricultural development in East Asia. The first is the incipient plant cultivation stage during which cultigens were introduced to supplement the hunter-gathering economy. The Xinglongwa culture in northeastern China and the Jomon culture in Japan are examples of cultures from this stage.

The second stage is the early agricultural stage when plant cultivation became the major subsistence activity, although hunting and gathering still played an active role. The early phase of the Neolithic in China (6000-3000 BC) belongs to this stage. Examples of Neolithic cultures of this stage include the Chishan, Peiligang and Yangshao cultures in the Yellow River Valley, all of which were characterized by the cultivation of millet and the domestication of pigs. Examples of this stage from the Yangzi River region of southern China include Neolithic cultures such as Hemudu and Majiabang, both of which were characterized by wet rice cultivation and the domestication of pigs. In this region, fishing provided prehistoric people with necessary protein (Komoto 1992).

Excavations at the Caoxieshan site, which belongs to the Majiabang culture dating back to 4000 BC, has provided clear evidence of a paddy field system. This is the earliest paddy field site ever excavated in East Asia (Fujiwara 1996). At this site, the paddy fields consist of a series of small hollowed plots, oval or rectangular in shape and 2-3 m long (Figure 1). Rice phytoliths were detected from these plots. Spades or hoes made of water buffalo scapulae were used for digging and tilling. Faunal remains recovered from the site include wild species, such as sika deer and roe deer, as well as domesticated pigs. This implies that hunting still played an important role in subsistence.

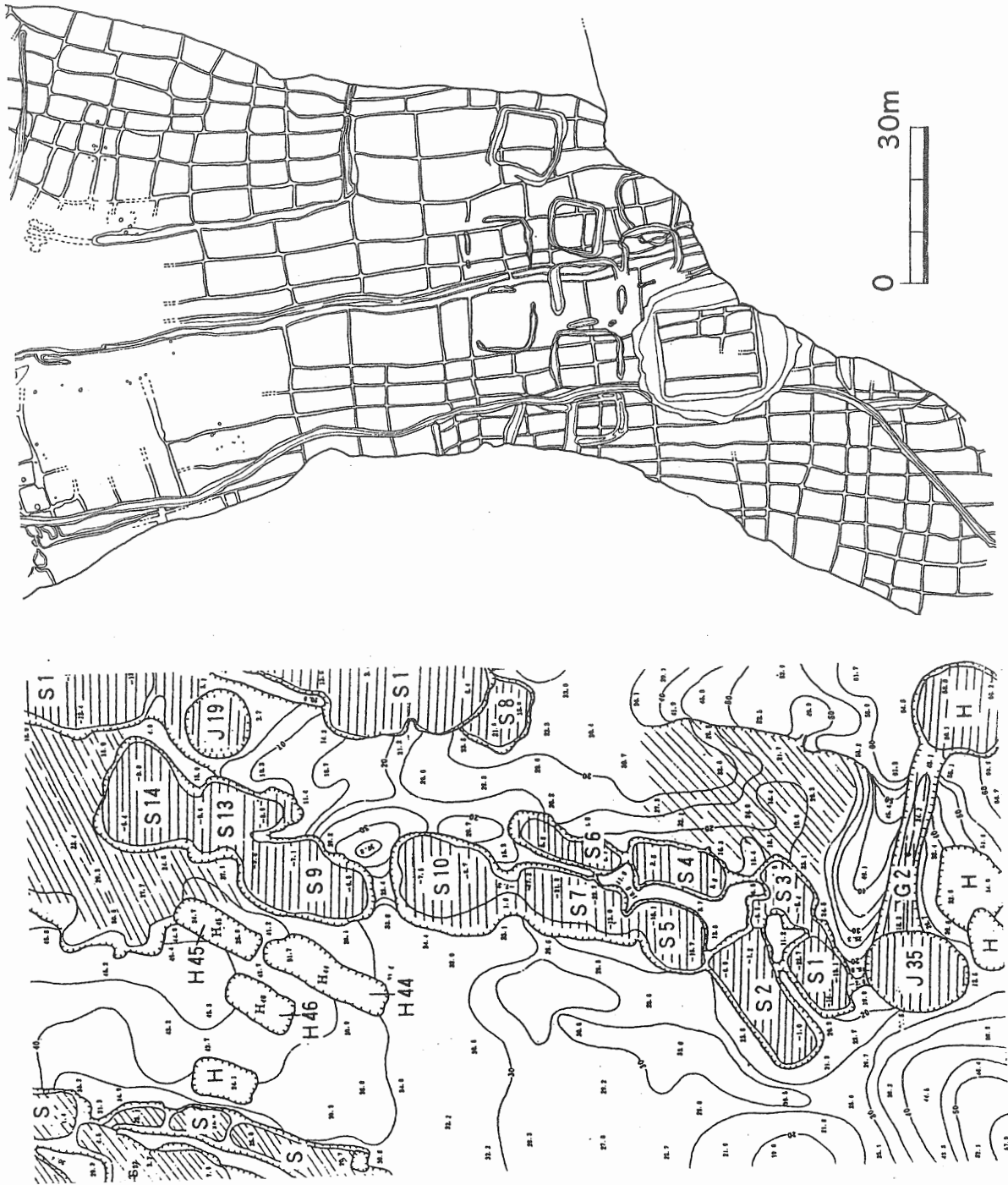


Figure 1: Field system at the Caoxieshan site, China (left) and the Hattori site, Japan (right).

Finally, the third stage can be called the mature agricultural stage, during which agricultural practice was intensified in order for the ruling class to exploit social surplus as tribute. This third stage was achieved as a result of the development of social stratification which was caused by the increase in agricultural productivity in the second stage. The intensification of agriculture in the third stage grew out of the production of offerings in chiefdom societies or tribute in early states. Chiefs or kings organized large-scale irrigation systems and conducted large-scale land development so that they could receive more offerings or tribute.

In the process of the urban revolution proposed by Gordon Childe, similar agricultural intensification occurred in various parts of the world. Childe argued that an increase in the productivity of agriculture, which produced social surplus, was the cause of population growth and the emergence of the social division of labour (Childe 1936:4). It is apparent that agricultural productivity correlates with population growth and social stratification. However, many researchers, such as Sahlins (1972) and Flannery (1994:104), do not believe that social surplus was accumulated as a natural process in the agrarian society. Rather, it was the urban revolution and the establishment of political power that enabled rapid land exploitation and agricultural intensification. It became important for the ruling class to force all farmers into sedentism or tether them to cultivated land in order to maintain a constant and stable revenue. The sedentism of farmers was intensified not only by the agricultural productivity of this time, but also by the policy of the ruling class. It is likely that the ideology which promotes sedentism was intentionally created by the ruling class in this process.

The mature agricultural stage began in the Late Neolithic period in East Asia around 3000 BC. The Longshan culture in the Yellow river drainage and the Qujialing culture in the Yangzi river region belong to this stage. During this stage, social stratification developed in such a way that large walled settlements, temples and mounded tombs were built for the elites. The civil engineering techniques and human power mobilized for the construction of these large settlements and monuments suggest a high level of agriculture in this stage. These developments in stage three prepared for the establishment of city states and the construction of large royal tombs in the Shang dynasty.

CHARACTERISTICS OF YAYOI AGRICULTURE

Wet rice agriculture at the beginning of the Yayoi period was already characterized by a set of advanced traits. These included rice varieties suitable for cold climates, rice paddy fields with irrigation facilities and highly developed agricultural implements. Wet rice was cultivated at the

beginning of the Yayoi period even in the northern parts of mainland Japan, indicating that rice varieties employed there were already adapted to a cold climate.

Excavations in Japan have revealed early types of rice paddies. The Itatsuke site in Fukuoka Prefecture, Kyushu, provides an example. A plot of paddies excavated at the site is of rectangular shape, 10 m wide and more than 30 m long. The plot is surrounded by small embankments protected by a line of wooden planks and fences (Figure 2). Along one side of the embankments runs a water course 2 m wide and 1 m deep, which is also supported by wooden materials. Furthermore, at one place in the water course, many wooden stakes were placed in lines which cross the flow, providing a sluice for the field. Detailed examination of this structure indicates that it provided a highly elaborate system of water supply and drainage.

From the first stage, there had been two types of field division system: the first type had small sub-sections within a plot, while the other type did not. The former, generally located on slightly sloping ground, had small sub-sections of irregular shape and varying size (Figure 3). The sub-sections were usually oblong or rectangular in shape, with areas ranging from 5-100 m². These sub-sections can be interpreted as a labour-saving device for irrigating each plot without much effort to produce large-scale, level fields. We

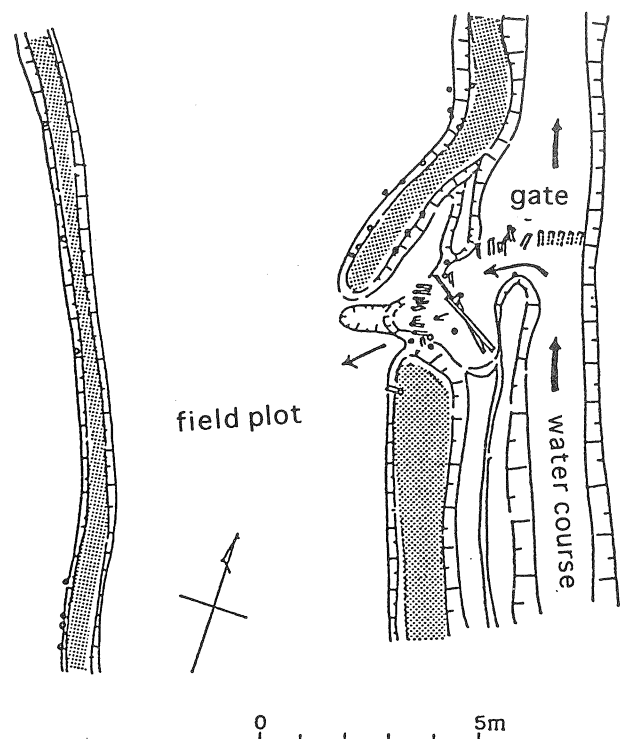


Figure 2: Sluice gate at the Itatsuke site, Fukuoka.

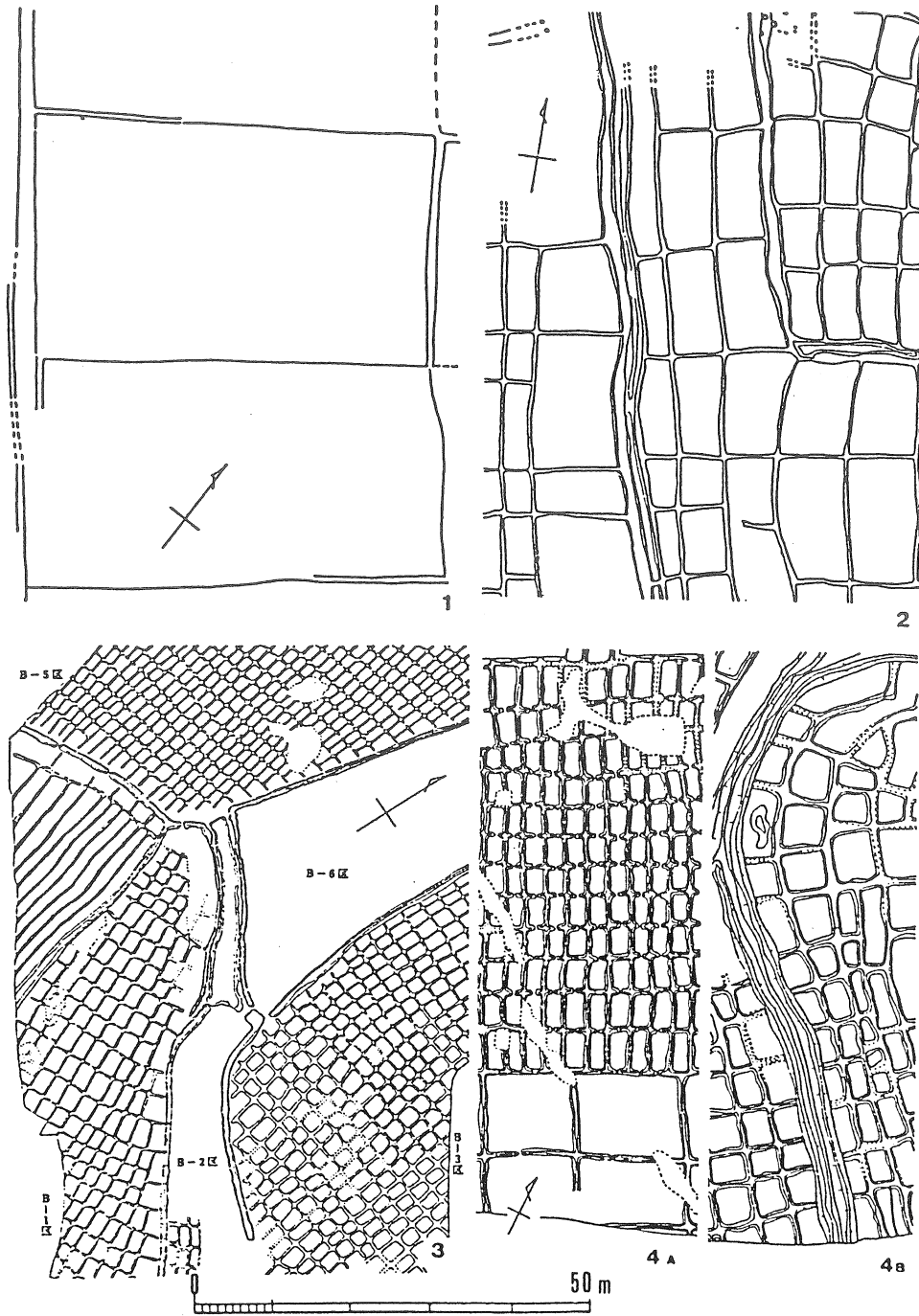


Figure 3: Two types of fields: 1. plots without sub-sections (Toro, Shizuoka). 2-4. plots with sub-sections (2. Hattori, Shiga; 3-4. Ofuro, Gunma).

can trace the origin of such a method to the series of small, hollowed plots excavated at the Caoxieshan paddy field site in China mentioned above.

Agricultural implements from Yayoi sites include wooden hoes and spades, lunar-shaped reaping knives of polished stone, and wooden mortars and pestles for processing harvested rice. The hoes and spades were of various kinds and were designed for tillage and ditch digging and soil turning respectively. It is very likely that all of these new types of tools were introduced by immigrants, since similar tools have not been reported from Jomon sites.

Farmers of the Yayoi period also practiced dry-field cultivation of wheat and melon. Cultivation techniques of these species originated in continental Asia and were unknown to the people of the Jomon period. Furthermore, a furrowing technique practiced in dry-fields has been evidenced by excavations of field systems from the Late Yayoi to the succeeding Kofun period (Figure 4). This technique existed in the Early Iron Age of the Korean Peninsula, for example at the Sanchonri site in southern Korea. Since the furrowing technique was depicted in clay models from Late Han tombs in China, we can trace its origin to the continent and suggest that this technique was introduced into Japan at the beginning of the Yayoi period.

It is worth noting that the Yayoi assemblage of agricultural techniques was accompanied by other cultural traits. These include moated settlements, mounded tombs, bronze and iron tools, stone tools of continental origin and weaving techniques. All of these characteristics had never existed in the preceding Jomon period.

Moreover, physical anthropologists have examined a large number of human remains from Jomon and Yayoi burials and studied the population history of the Japanese Islands. Based on these studies, Kazuro Hanihara has proposed a "dual structure model". In this model, he argues that the first occupants of the Japanese archipelago came from somewhere in Southeast Asia during the Upper Paleolithic and that they were the direct ancestors of the people of the Jomon period. Following this, a second wave of migration from Northeast Asia took place during and after the Yayoi period (Hanihara 1991).

CHARACTERISTICS OF JOMON PLANT CULTIVATION

As mentioned earlier, the Jomon people introduced such cultigens as millet and beans to supplement the hunter-gatherer economy. The majority of these plants were suitable for dry-field cultivation. The presence of rice impressions on pottery, as well as phytolith analyses of potsherds from Late and Final Jomon period sites, indicates that rice was also cultivated primarily in the western part of Japan. Topographical characteristics of the sites associated with

rice impressions and rice phytoliths suggest that a dry-field system is the most probable method of cultivation adopted in these sites (Sasaki 1971:82; Fujiwara 1998:132). Chipped stone hoes and spades were also found from these sites. These tools were probably used for the preparation of dry-fields. These tools are very different from the wooden implements used for Yayoi paddy field cultivation. It is important to note that we do not see any significant increase in the number of settlements during the Late and Final Jomon periods. Because there is no indication of rapid population growth during these periods, we can conclude that the Jomon people in these periods never abandoned the hunter-gathering way of life. We can explain relatively low productivity through pedological studies of the Japanese archipelago where there are widely-spread acid soils not suitable for dry-field cultivation (Teshigawara 1998:172). Later techniques of manuring and other fertilizers made dry-

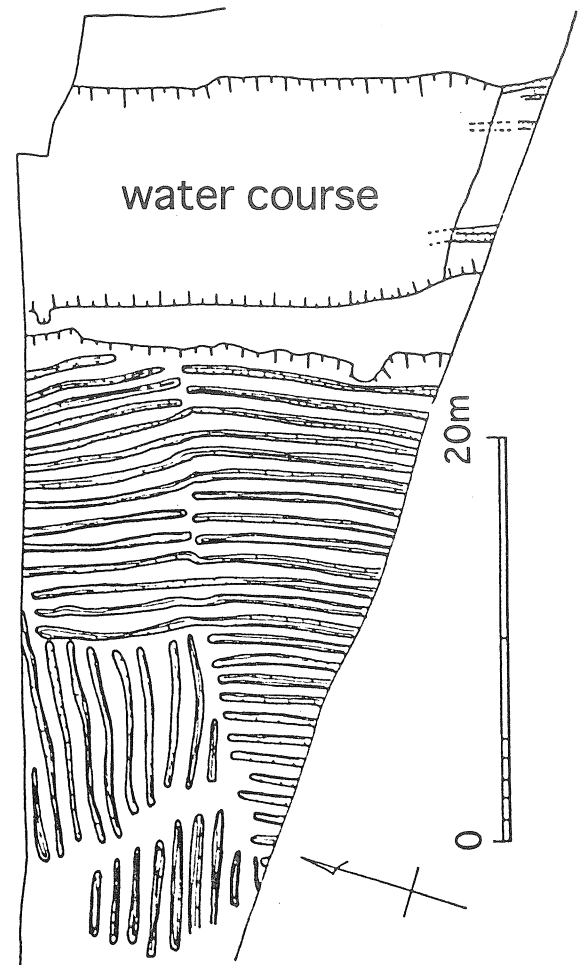


Figure 4: Furrows of a field at the Ashida-Kaito site, Gunma.

field cultivation more productive, though it was the existence of the paddy field system that enabled people on this land to manage this unfavorable soil. Consequently, incipient plant cultivation in the Jomon period should be regarded as just a supplement to the hunter-gathering economy, not as a major subsistence strategy.

THE TRANSITION FROM JOMON TO YAYOI

The transition process from the Jomon hunter-gathering lifeway to Yayoi agriculture was different in western and eastern Japan. The subsistence economy of western Japan during the Jomon period was less stable than that of eastern Japan due to the relative scarcity of resources suitable for hunting and gathering. Based on the number of settlements, Koyama (1984:32) estimates the Jomon population density in western Japan to be one-tenth of that in eastern Japan.

This historical background can explain why wet rice agriculture easily replaced the hunter-gathering economy and spread rapidly over western Japan at the very beginning of the Yayoi period. By the Middle Yayoi wet rice agriculture became the major subsistence economy. The rapid increase in the number of settlements suggests population growth during this period. However, this new wave of expansion of wet rice agriculture stopped at the western border of the Tokai region on the Pacific coast and the Hokuriku region on the Japan sea coast (Figure 5). It was not until the Middle Yayoi period that Yayoi agriculture again made further expansion eastward.

On the other hand, there were certain groups of people in eastern Japan who adopted wet rice agriculture even in the Early Yayoi period, as evidenced by the discoveries of

paddy fields at the Nogiwa site in Shizuoka, the Miyanomae site in Yamanashi, and the Sunazawa and Tareyanagi sites in Aomori (Figure 5). It is interesting to note that paddy fields have been recovered even in northern Japan and that these groups of people who adopted wet rice agriculture were sparsely distributed, indicating that some groups adopted wet rice cultivation, but that the majority of the people at that time did not. These facts lead us to suggest that small groups of people in western Japan who were familiar with wet rice cultivation moved into eastern and northern Japan to establish paddy fields there.

This also implies that the rice varieties employed at the beginning of the Yayoi period were adapted to a cold climate and it is unlikely that the difference in climate between western and eastern Japan prevented the eastward expansion of Yayoi agriculture during the Early Yayoi period. It is, therefore, reasonable to conclude that most groups of hunter-gatherers in eastern Japan were reluctant to adopt Yayoi agriculture as a set of subsistence strategies during the Early Yayoi period. It seems that they had no reason to abandon their hunter-gathering economy due to its reliability as a subsistence strategy (Hayashi 1986:116).

During the Middle Yayoi period, wet rice agriculture was fully developed in eastern Japan. At the same time, a set of cultural traits identified in western Japan in the Middle Yayoi period was also adopted in eastern Japan. These cultural traits include moated settlements and square-shaped mounded tombs. Since moated settlements were usually accompanied by ramparts or palisades, these can be explained as defended settlements. Moreover, weapons and armour were found there. These imply that migrations or sometimes invasions from the west border of the Tokai region played some role in the great changes associated with the eastward expansion of Yayoi agriculture.

As a consequence of these changes, an early state based on a highly stratified society was established during the Kofun period (AD 250-600) which was characterized by the construction of large keyhole-shaped tombs (Tsude 1989:490, 1992). This achievement was the result of a series of developments after the commencement of wet rice agriculture in Japan in the 4th century BC. It took only about 600 years for societies in the Japanese Islands to attain this level of social complexity, a time span which is rather short compared with the core areas in central China (Sahara 1987:328). This rapid social change was possible because the Yayoi people adopted a high level of agricultural technology, hierarchical social systems and the ideology associated with the mature agricultural

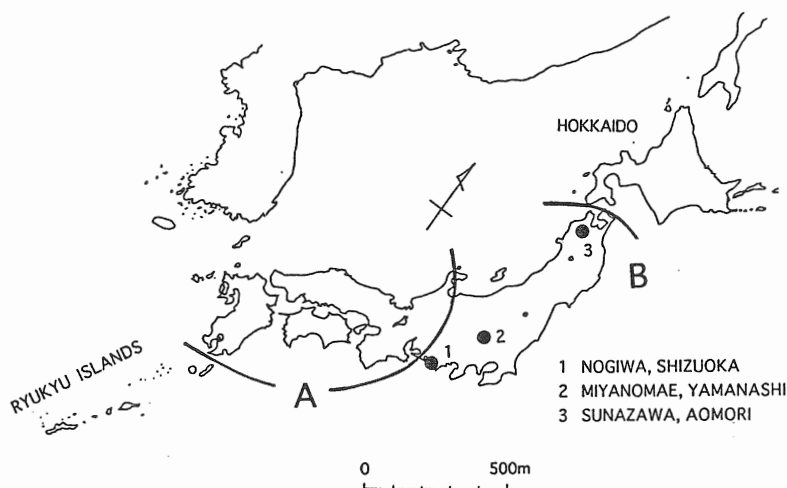


Figure 5: Distribution of wet rice agriculture in the Early Yayoi Period (Zone A: Western Japan, Zone B: Eastern Japan).

stage, all of which were already developed in continental Asia. In other words, Yayoi agriculture was a secondary product of the mature agriculture which developed in the core area of China.

CONCLUSIONS

This process from the beginning of wet rice cultivation in western Japan in the Early Yayoi period to the adoption of wet rice cultivation by the people of eastern Japan gives us some valuable clues to explain the transition from hunter-gathering to agriculture in Japan. It is apparent that Jomon people developed incipient plant cultivation but it did not naturally evolve into Yayoi agriculture. It was pressure from the outside that forced the people of the Japanese Islands to adopt the lifeways of Yayoi agriculture. This is particularly noticeable in eastern Japan where, without this pressure, most people would have continued their hunter-gatherer lifeways associated with incipient plant cultivation, at least for a while. It is necessary to re-evaluate the great viability and historical significance of the hunter-gatherer way of life in eastern Japan which had a long history of several thousand years. Such analysis will also give us a clear idea why hunting and gathering lasted much longer in Hokkaido, the Ryukyu Islands and other islands in the Pacific Ocean where wet rice cultivation and the stage of mature agriculture began much later.

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