

# The Jōmon–Yayoi Transition in Eastern Japan: Enquiries from the Kantō Region

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## ABSTRACT

*This paper anchors itself in the spread of Yayoi culture from Kyushu into eastern Japan during the Early Yayoi period. The transition from Jomon culture to Yayoi culture at the end of Early Yayoi into Middle Yayoi periods in the Kantō region is then inspected through the lenses of jōkonmon 条痕紋 (scraped surface) ceramics, then secondary jar burials and settlement in Gunma Prefecture, and finally subsistence. In particular, the finds of non-rice grain impressions in pottery are beginning to illuminate lifeways before the adoption of irrigated rice agriculture from the mid-Middle Yayoi period onwards. Significantly in Gunma, irrigated rice agriculture is not thought to have evolved locally through western influences or borrowing but was brought in by newcomers from Nagano Prefecture, resulting in the disappearance of Jōmon–Yayoi transitional lifeways and dominance of the Yayoi ‘package’ as in western Japan. This particular situation in Gunma defies the traditional interpretation of the spread of rice agriculture into eastern and northern Japan without migration. Data from other Kantō areas undoubtedly offer comparative material to obtain more comprehensive views on the north-eastern Yayoi culture and should be combined with what is presented here.*

**KEYWORDS:** Japanese archaeology, Yayoi period, rice agriculture, Kantō prehistory, jōkonmon pottery, secondary burials, dry-field crops

## 1. Agricultural beginnings

Forty years ago, as indicated in Figure 1, Yayoi subsistence in eastern Japan was assumed to have been based primarily on millet rather than rice agriculture. In addition to having no bronzes, Eastern Yayoi was thus deemed quite different from the Western Yayoi culture of intensive wet-rice agriculture that supported large moated villages equipped with iron tools and bronzes both weaponry and ritual items. In the intervening decades, research on the introduction and consequent spread of agriculture throughout the Japanese Islands from Kyushu in the west has been revolutionized, and new dates for the introduction and spread of metals eastwards have also been obtained. There is now a gap of ca. 550 years between the start of irrigated rice agriculture in North Kyushu and north-eastern Japan. This paper deals with that timespan.

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Figure 1. Yayoi woman processing millet in Gunma Prefectural Museum installation, circa 1979, Takasaki City (photo by author)

### 1.1 From Kyushu eastwards

The initial phase of wet-rice production was limited to just the Karatsu and Fukuoka Plains of the northern Kyushu coast, introduced from the southern Korean Peninsula (Miyamoto 2019). Miyamoto (2018) concludes that the transition from Jōmon to Yayoi culture occurred (*within that limited region*) during Yuusu I–II ceramic phases, but the typical attributes of Yayoi culture (paddy fields, moated villages, wood-coffin burials in linear arrangements, continental-style tool-kits, etc.) were not consolidated until the Itazuke ceramic phase as known from the Itazuke 板付 type site. These attributes are referred to by Miyamoto as the Yayoi ‘complex’ but are also known in English as the ‘Yayoi package,’ following Mizoguchi’s volume (Mizoguchi 2013) documenting the Jōmon–Yayoi transition in North Kyushu. Miyamoto (2019) considers this consolidated Itazuke-style Yayoi culture to mark the beginning of the Yayoi period at 5–6<sup>th</sup> centuries BC and thereafter spread from North Kyushu throughout the Inland Sea region and beyond during Itazuke Ib–IIa phases (cf. Kaner & Yano 2015).

Long before the Itazuke excavations in 1951–1954, Itazuke-style pottery was found throughout western Japan and known as Ongagawa pottery by analogy with artefacts dredged from the Onga River in North Kyushu. Thus ‘Ongagawa’ pottery (Itazuke Ia–IIb) has been traditionally used to track the diffusion of Yayoi culture throughout most of western Japan during the first phase of expansion. FUJIO Shin’ichirō dates this expansion from 700 BC, reaching the Kinai area by 600 BC (Fujio 2014, fig. 12), while MIYAMOTO Kazuo postulates it reaching the Kinai by the 5<sup>th</sup> century BC (Miyamoto 2018).

In the initial modelling of the spread of rice agriculture (Figure 2), Akazawa (1981) postulated that Yayoi peoples travelled eastwards from the incubation area in northern

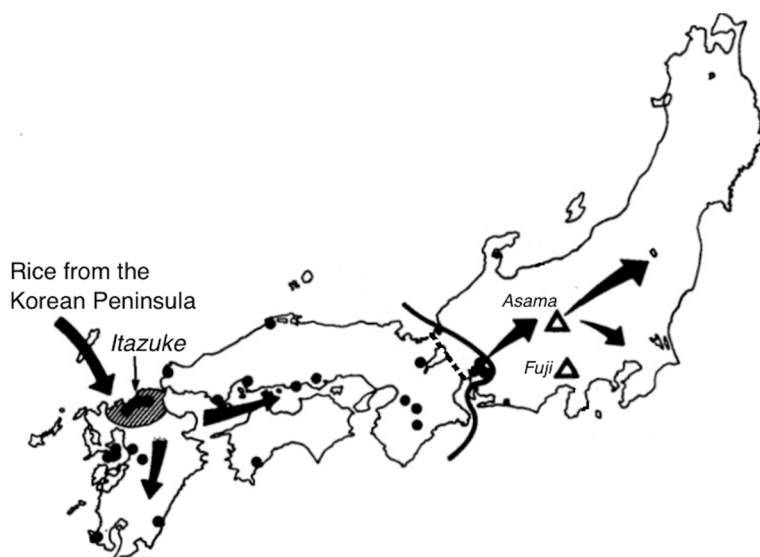


Figure 2. Hypothesised spread of rice agriculture by Akazawa Takeru (Akazawa 1982, Figure 14, modified by author)

Kyushu (Figure 2, hatched area), colonizing the Inland Sea coastal regions where the lowlands supplied plenty of water for wet-rice cultivation. However, this first stage of diffusion ended at the curved line near the Waist of Honshū [my term] (Figure 2, dotted line); from there, the spread of rice agriculture was hypothesized to have transited through the interior mountain basins, avoiding the coasts along the Japan Sea and the Pacific seaboard where Jōmon lifestyles prevailed in large fishing communities (Akazawa 1981, fig. 15, 1982, fig. 4.6). In his 1981 illustration, the rice distribution arrow points straight to Mt Asama, one of the active volcanoes in landlocked Gunma Prefecture (our target area), essentially presaging the later route of the Tōsandō trunk road established in the Nara Period (710–794 AD). From Gunma, Akazawa’s arrows branch northwards into Tōhoku and eastwards down the Toné River. He quotes KANASEKI Hiroshi and SAHARA Makoto as saying “The second diffusion traveled inland—through the basins and valleys of Yamanashi and Nagano Prefectures, along the base of Mt. Asama to northern Kantō and on to Fukushima Prefecture in northern Japan, but it never reached the large southern Kanto Plain” (Akazawa 1981, p. 241).

In the very year of Akazawa’s publication, rice paddies were excavated at the Sunazawa and Tareyanagi sites in far northern Aomori Prefecture, immediately invalidating his hypothesis. Established ca. 380 BC, they only lasted 300 years before failing, and the inhabitants are thought to have reverted to Jōmon lifestyles (Fujio 2017, p. 8). More AMS dating of the diffusion of rice agriculture has revealed not a steady spread but some hop-

scotching along the coasts. KOBAYASHI Ken'ichi has produced a graph of  $^{14}\text{C}$  dates calibrated with IntCal04 that shows wet-rice was adopted in Kochi (ca. 830 BC) before Oita (ca. 680 BC), Kobe (ca. 600 BC) then Osaka–Kawachi (ca. 580 BC), Nara and Aichi simultaneously (ca. 510 BC), but then Aomori (ca. 450 BC) and Sendai (ca. 310 BC) before Kanagawa (ca. 200 BC) (see Barnes 2015, fig. 11.12; Kobayashi 2014, 2017). This sequence essentially agrees with the new presentations in the renewed exhibitions at the National Museum of Japanese History ('Rekihaku' hereinafter). The dates, however, are based on limited sample sizes which will be filled out with continuing research, and there is some controversy over what is meant by "adopting" rice agriculture.

Excavations in Kanagawa Prefecture have indicated a stop-start pattern for the introduction of rice (Kanagawa Kyōi 2012; Odawara-shi Kyōi 2017), where farming villages have been established multiple times by incoming migrants but initially failed—as at the Aomori sites. It was not an easy process, exacerbated by the old adage 'Given that hunter-gatherers can obtain their food within four hours a day, who would want to become a farmer with 10-hour working days?.' In addition, the social relations between migrant rice farmers and the local peoples who were continuing Jōmon lifestyles are just beginning to be worked out, region by region.

In western Japan, Jōmon and Yayoi peoples are flagged by their respective pottery shapes: Ongagawa cooking pots (*kame* 甕) and new shapes such as storage pots for the incoming farmers, versus *tottaimon* 突帯文 cooking pots (*fukabachi* 深鉢) for the locals (Fujio 1991). Note that different terms are applied to cooking pot shape-types in the different traditions (*kame* vs *fukabachi*); this helps in the discussion of their comparative attributes—though some researchers have overridden these distinctions (Satō 2002). Neither Ongagawa nor *tottaimon* are Jōmon 'types' or Yayoi 'styles' in terms of the standard ceramic chronologies: the Ongagawa derivation was explained above, while *tottaimon* refers to a Jōmon-lineage cooking pot that bears appliqué bands on the rim and shoulder; the raised bands are often notched or pinched in pie-crust mode.

Fujio (2009) has researched ceramics in the Kinai region (especially Osaka Bay) during the period of rice introduction, revealing—by innovative juxtapositioning of ceramic chronology with calibrated radiocarbon dates—that there was a span of 100–150 years during which cooking pots of both *tottaimon* and Ongagawa potteries were used together in most sites. The Ongagawa cooking pots, along with the new shape-types of jars and pedestaled bowls, are hypothesized to have been brought in by few migrants who then integrated into Jōmon villages. Fujio hypothesizes that the makers of the Ongagawa and Jōmon-style cooking pots were not different peoples (migrants vs locals) but that the ceramics could be made by both and that everyone used both (Fujio 2009, pp. 397–8) until a distinctive regional style developed from the middle of Early Yayoi.

These convoluted situations have raised many problems of terminology—not only about



the people using these different potteries but about their subsistence means and cultural affiliations. In particular, Fujio (2017) tracks the different concepts used in past research in formulating the common concepts of ‘Yayoi period’ and ‘Yayoi culture.’ The post-war definition of Yayoi culture based on the trinity of wet-rice agriculture, metal use, and moated settlements was first discarded in favour of Sahara’s definition of the Yayoi Period (Sahara 1987), which was based purely on rice agriculture with no other attributes deemed necessary. This definition is now causing great problems not only due to emerging evidence of non-rice agriculture, especially millets, but also because of the growing realization that aspects of the formal Yayoi complex could be adopted separately, e.g. rice can be grown without paddy fields (e.g. Nasu & Momohara 2016).

Fujio clarified distinctions in Yayoi culture across the archipelago based on FUJIMOTO Tsuyoshi’s framework of the *naka no bunka* (中の文化 ‘central culture’). This approach first postulates a Yayoi cultural system based on irrigated rice agriculture that, once instituted, cannot be reverted back to earlier lifestyles (as happened in Aomori Prefecture, mentioned above). In Fujio’s scheme, for the first 250 years after inception, the Central Culture is confined to the region around Genkai Bay (Fukuoka Prefecture in Kyushu). Then by the mid-6<sup>th</sup> century BC, it had spread southwards to the border of Miyazaki Prefecture and eastwards to slightly beyond the Waist of Honshu (Fujio draws the line from Fukui Prefecture to the Tenryū River in Shizuoka Prefecture [Fujio 2017, p. 14, fig. 4]). By the 3<sup>rd</sup> century BC, the Central Culture had penetrated to the Toné River in Gunma Prefecture. This two-stage process of diffusion out of North Kyushu resulted in two variations of the Central Culture (I-A, I-B), plus another three cultural regions that were peripheral, all of which co-existed until the beginning of the Kofun period in 250 AD. I-A and I-B have in common: irrigated wet rice agriculture and dry-field farming, moated villages and warfare, bronzes and moated-precinct burials with grave goods; but I-B is lacking in bronze *ritual* goods. I personally have always made a distinction between Western Yayoi with bronzes and Eastern Yayoi without bronzes, but this only holds for the Early and Middle Yayoi since non-ritual bronzes are now known in eastern Japan in Late Yayoi. It is area I-B, between the Waist of Honshu and the Toné River, that we are concerned with in this paper.

Within these spatially defined cultural areas, Fujio has also monitored the temporal (vertical) transitions from Jōmon to Yayoi culture, which happen at different rates in every sub-region (horizontally). These are illustrated such that Yayoi cultural traits became ‘denser’ through time in the west (Fujio 2017, fig. 2). At first there are ‘blurred’ regions as local Jōmon and Yayoi traits are mixed, then comes the firm adoption of irrigation agriculture, then moated settlements, and finally bronzes. This succession becomes less routinized in north-eastern Honshū and bronzes were mostly absent. There even arises the question whether the Tōhoku cultures can be considered Yayoi, which stimulated the 2017 Yayoi Research Group symposium in Sendai on the theme “Didn’t Yayoi Culture Exist in

Sendai Plain?”

A most important part of Fujio's presentation is that he treats the Yayoi period as a *container* that holds many different cultures through time: Jōmon culture(s) continued to exist throughout large parts of the country *in the Yayoi period* (Fujio 2017, fig. 2) until irrigated rice agriculture was adopted; thus, the period is Yayoi but there are *cultures in parallel existence*. I myself have tried to represent the cultural transformation by a diagonal line between the Jōmon and Yayoi periods (cf. Barnes 2015, table 0.1a), instead of the more traditional drawing of a horizontal line between Jōmon and Yayoi periods at one specific time. Shitara, on the other hand, describes the changes from Jōmon to Yayoi in stepwise fashion (Shitara 2014, table 1), with the Yayoi period beginning at different times in different areas; this results in *different periods in parallel existence*, similar to my diagonal rendition. For the Chūbu (central mountains) and South Kantō regions, Shitara assigns all pottery styles during and before the temporal equivalent of Itazuke IIB to the Jōmon period. These are three different conceptual solutions to the problem of addressing the gradual spread of irrigated rice agriculture: how should we deal with these problems of whether culture=period or not?

- Are the people still following Jōmon lifeways, after the formation of the Yayoi package in the Yayoi Period, Yayoi people? Most would say *no* because by definition, the migrating Yayoi farmers are a genetic admixture of immigrants from the Korean Peninsula and local Jōmon populations (hereafter referred to as admixed type). The local peoples (*zairaijin* 在来人), still following Jōmon lifeways, stand in opposition to these incomers.
- Are they then Jōmon people? Many would say *no* because they live in the (formalized) Yayoi Period, but Gunma archaeologists and Shitara (2014) are adamant in maintaining that the locals are Jōmon people until they themselves adopt rice agriculture and become Yayoi by acculturation (if not genetically).
- Satō (2002) has documented the occurrence of Ongagawa cooking pots (*kame*) in Tōhoku and notes that there then begins a process of local production of such pots ('Ongagawa-like pottery'); he suggests that when this happens, there is a cultural shift because the *kame* cooking pot represents a *particular cuisine*=rice. Are the people then Yayoi? Fujio acknowledges that people who use only *tottaimon* pottery are Jōmon, but do trade ceramics count for acculturation, or do their own ceramics have to change as documented by Satō?
- When *jōkonmon* 条痕紋 pottery from, for example, the Tōkai region is imported into Gunma, does it signify the Yayoinization (another term from Mizoguchi 2013) of the local Jōmon?
- Until then, should we call the locals Epi-Jōmon or Zoku-Jōmon, a term already in existence for followers of Jōmon lifeways in northern Tōhoku and Hokkaidō from 400 BC or so? HAYASHI Kensaku proposed such as long ago as 1987 (Shitara 2014, p. 451).



Figure 3. A Yayoi-type jar from Gunma featuring a *tottaimon* (notched, raised band) rim and *jōkonmon* (scrape-marked) body finish (Photo by author, modified, at Gunma Archaeological Research Foundation exhibit)

- And then, what about their ceramics: should Yayoi-period *tottaimon* and *jōkonmon* potteries (Figure 3), which retain many Jōmon ceramic features and are different from Ongagawa pottery, be called Epi/Zoku-Jōmon pottery?

These are difficult questions, and often the answers cannot be broad-brushed but need to be applied site by site. We need a new vocabulary with which to discuss encounters between genetically and culturally different people *within* the Yayoi period (if we adopt Fujio's 'period as container' approach, which I now think is the most satisfactory). There was confusion of multitudinous peoples, cultures, subsistence patterns and ceramics during the Yayoi period; these must be acknowledged during incremental cultural change—from horticultural practices to farming different dry-crops with the final stage being the adoption of irrigated rice, even though rice does not represent the entire subsistence system. As Shitara's (2014) title implies, Yayoi culture *is* a complex of multiple farming cultures. Although Ongagawa ceramics remain a flag for irrigated rice transmission, pots can travel through trade and exchange, and they may hold other grains such as millet and barley, which prove themselves to be easier to grow than obtaining the technology for wet-rice agriculture (paddy fields, specialist tools, social management techniques). As we shall see below, acculturation may first involve millets rather than rice and still lead to a 'farming culture.'

But is that Yayoi culture or not?

Despite the modern Japanese self-identification with rice as formulated by Ohnuki-Tierney (1993), in the last 25 years archaeologists are coming to acknowledge that rice was always accompanied by several other grains (the historic *gokoku* 五穀, ‘five grains’) (Ando 2014; Shitara 2014; Hamada 2019). Also, hunting, fishing, and gathering of wild plant and animal foods are known to have continued much longer than the Jōmon Period *per se* (e.g. Shitara 2006, p. 142). Dry-field farming of vegetables and some grains in specialized garden plots is well-established in the historic literature (cf. von Verschuer 2016) and is now becoming accessible archaeologically. Ando’s critical review of rice-orientated research and interpretation (Ando 2014) also challenges the unreflective use of the ‘culture’ concept in trying to deal with the multitude of possibilities in gradual and localized cultural change as intimated above.

Excavations have mainly produced data on paddy fields because they are large, substantial features that can be preserved in the archaeological record. On the other hand, paddies are rare: they are only preserved when buried intact by flooding or volcanic activity, as Noto Takeshi maintains. Moreover, their sparse recovery does not inform on potential dry-field agriculture for which field systems are even more ephemeral until the raised ridge (畝 *une*) gardens of the Kofun Period. Rice is assumed to have arrived into Kyushu slightly before other grains, but Shitara asserts that probably all the grains spread through the archipelago together; nevertheless, he proposes that initial farming efforts in the Kantō involved a variety of grains rather than a focus on rice alone (Shitara 2014, p. 458, p. 463).

## 1.2 The view from Gunma

Gunma is not a mountain basin but entails the farthest northwest corner of the Kantō Plains. The Japanese definition of ‘plains’ (平野 *heiya*) takes in alluvial lowlands, riverine terraces, alluvial fans, and rolling uplands (cf. Barnes 2010). The translation here of *daichi* 台地 as ‘tableland’ rather than ‘plateau’ reflects their low relative elevation and low separation (ca. 2–5 m) from the adjoining alluvial flats. Gunma is a land-locked prefecture, isolated from sea routes along the Pacific coast and the Japan Sea. The Somagahara-Maebashi tableland (Figure 4-a), supporting Takasaki and Maebashi cities, is bounded on three sides by mountains (somewhat like an inland peninsula). From its northern hinterlands flows the Toné River (Figure 4-1), one of the two major suppliers of alluvium in the western Kantō Region—the other being the Arakawa River (Figure 4-2), originating in the Chichibu Basin. These rivers cut through the thick layers of volcanic ash and pumice deposited by the volcanoes surrounding the Kantō Plains: the major ones being Asama, Haruna, and Akagi-yama all in Gunma, and Fuji and Hakone in south Kantō. Akagi-yama ceased activity in the Pleistocene, but the others are active volcanoes and have deposited tephra several times within the Holocene (see Barnes & Soda 2019). Tephra deposits form the uplands of

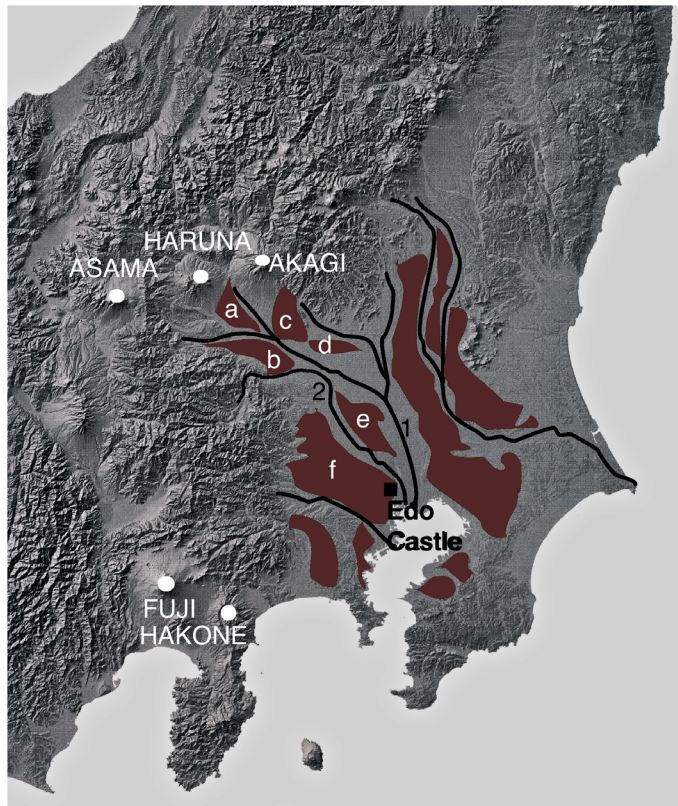


Figure 4. The geomorphology of the Kantō Plains, illustrated with the Toné River flowing in its original course directly into Tokyo Bay near Edo Castle (after Kaizuka et al. 2000, map 3, modified by M. Inoue and author; base map by Kokudo Chiri'in). River reconstructions approximate 1 Tone River; 2 Arakawa River; a Somagahara-Maebashi tableland; b Fujioka-Kushibiki tableland; c Ōmama alluvial fan; d Tatebayashi-Ōta tableland; e Ōmiya tableland; f Irima-Musashino tableland

the Kantō Plains: the Somagahara-Maebashi tableland and downstream where Tokyo and Saitama cities spread over the Irima-Musashino and Ōmiya tablelands (Figure 4-e,f). Parts of Kanagawa Prefecture are also included in the southern Kantō Plains.

Unlike the coastal regions along the oceans and Inland Sea, the alluvial flats of the large rivers running through the Kantō Plains were constantly at risk of alluviation through flooding and erosion; thus the alluvium was avoided for settlement until modern times. The upland areas were also problematic, being mostly devoid of water and offering few opportunities for paddy construction. This reality is reflected both by the positioning of the Edo-period castle (Figure 4) at the edge of the Musashino Bluffs, and by the fact that the Musashino Plains to the west (Figure 4-f) were not highly colonized even at that time.

The Kantō Plains form a pivotal point between north-east and south-west Japan and



constitute an experimental laboratory for evaluating the mechanisms and progress in the spread of Yayoi culture from the south-west *under less than ideal conditions*. Within the Kantō region, Gunma provides an interesting case study in the transition to agriculture in the Early and Middle Yayoi periods.

## 2. Early to mid-Middle Yayoi (YI to mid-YIII) in the Kantō region

### 2.1 The ceramic evidence

Kanagawa researchers (Kanagawa Kyōi 2012; Odawara-shi Kyōi 2017) still recognize the boundary of this first dispersal during Yayoi I (by 350/280 BC) near the Waist of Honshu as proposed by Akazawa in 1981. This is because from there eastwards, the former Jōmon peoples (the Epi-Jōmon?) employed a surface finish named *jōkonmon* rather than the *hakeme* (刷毛目) marks of the Ongagawa pottery [Note: the technique of *hakeme* ('brush mark') surface finish was adopted before it was discovered that the marks were actually made by dragging a small tablet of wood over the surface, with the wood grain producing the marks (Yokoyama 1978). It should be more logically called *ita no mokume* (板の木目), wood-grain finish]; *jōkonmon* characterizes the pottery of the Early Yayoi Period in this region by having a surface scraped with a bivalve (clam) shell or bunched plant stems (Nagai 2007), and often the pot base bore a fabric impression. Like *tottaimon*, *jōkonmon* is neither a type nor a style [Note: 'Type' is used for Jōmon pottery, 'style' is used for Yayoi pottery] but a formation technique shared across a wide area. The main *jōkonmon* shape-

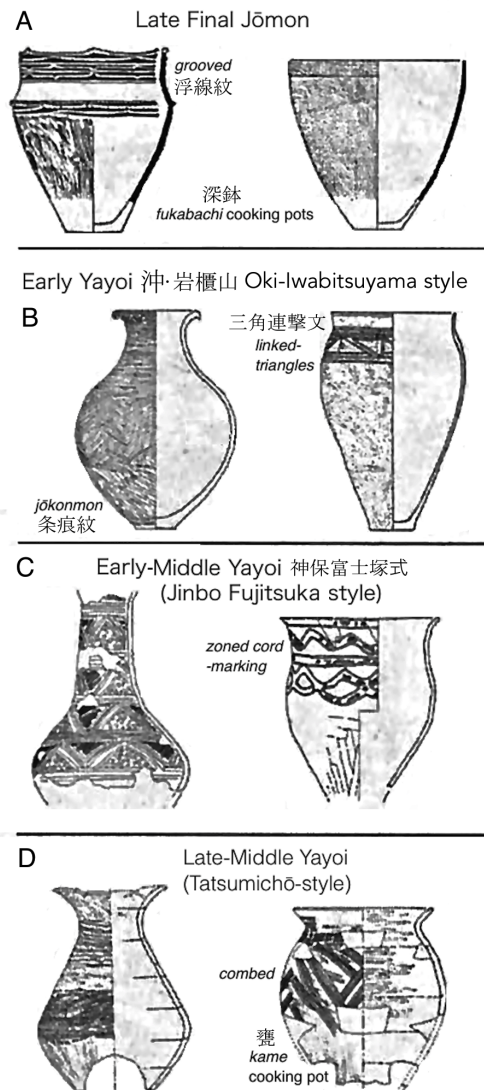


Figure 5. Final Jōmon to Middle Yayoi jar and pot shapes, decorations, and formation traces in Gunma (after Maebashi-Takasaki 2013, modified by author)

types were jars (often a modified version of the open-mouthed pot) and wide-mouth cooking pots (*fukabachi*) of a continuing Jōmon shape (Figure 5-A). Nagai divides the development of *jōkonmon*-lineage pottery into four stages: it spread inland first—to the north-east into Gifu Prefecture—before travelling up the Tōkai coast to Shizuoka and then inland into Yamanashi. By the end of the second stage, it had penetrated throughout the earlier Final Jōmon pottery sphere characterized by grooved lines (*fusenmon* 浮線紋) and with some local modifications (e.g. brushing with pine needles in southern Tōhoku).

The earliest pottery styles of the formal Yayoi period in the Kantō region (Figure 5-B) were influenced by *jōkonmon* formation techniques from the western Tōkai region in Nagai's second stage. OOKI Shinichirou of GARF (pers. comm. 16may'19) notes that although *jōkonmon* jars as developed in Aichi Prefecture were used only for storage, imported or copied *jōkonmon* jars in Gunma Prefecture were mainly used as cooking pots. The new *jōkonmon*-finished ceramics are named Dōyama-style in Kanagawa and Iwabitsuyama 岩櫃山-style in Gunma. Iwabitsuyama-style pottery appears in Early Yayoi sites of northwest Kantō: at Oki 沖 II and Kami(no)kubo 上(ノ)久保 sites in Gunma and Nyoraidō 如来堂C and Shijūzaka 四十坂 sites in Saitama (Watanabe 1986, p. 116). They contrast with Suwada-style (eastern Kantō) or Nozawa I-style (northern Kantō) ceramics, which are variously thought to represent the early to middle Middle Yayoi period in those regions (Watanabe 1986, p. 118). The geographical difference is explained by Iwabitsuyama-style pottery being influenced by *jōkonmon* pottery from Nagano Prefecture (GARF n.d., p. 2); Ooki suggests that the route of diffusion from Aichi to Nagano to Gunma was likely via the Tenryū River, a barrier to eastern diffusion noted by Fujio above.

Transitional Jōmon–Yayoi sites at the end of Early Yayoi in Gunma yield different combinations of ceramic styles:

- In the northern Kantō region, Ongagawa pottery occurs in extremely limited quantities: only a few sherds are known from Gunma Prefecture, for example at Itoi Miyamae 糸井宮前, Shiroishi Ōmidō 白石大御堂, and Oshide 押手 sites (see *Site Appendix and Appendix Bibliography* at the end). Many Gunma archaeologists consider that these are trade ceramics, and if rice was introduced in these containers, it did not lead directly to reliance on rice even if it was sown in that region during the Early Yayoi period.
- The Mt Iwabitsu 岩櫃山 site itself (see Photo in Site Appendix) yields three different styles (Watanabe 1986): one jar from Cave B is comparable to Maruko-style pottery from Tōkai (Watanabe 1986, p. 121); it exists together with a majority of local pottery decorated with linked-triangle designs (三角連撃文 *sankaku renkeimon*) and *jōkonmon*-finish as well as some zoned cord-marked wares of Jōmon-lineage (Figure 6).
- At Kami(no)kubo were discovered triangular-design local (Jōmon-lineage) pots but with a jar comparable to the Tōkai Suijinbira-style (Watanabe 1986, p. 117), which was distributed from Aichi and Gifu to Shizuoka, Yamanashi, and Nagano Prefectures.



Figure 6. Iwabitsuyama-style pottery from Gunma (photo by author, modified, at Gunma Archaeological Research Foundation exhibit)

- The Minami Ōtsuka 南大塚 site yielded Tōkai-style *jōkonmon*-finish pottery together with a local [Final Jōmon-lineage] jar.
- At the Oki II site, the earliest Yayoi was a jar with locally adapted *jōkonmon* finish, occurring together with local raised-band (*tottaimon*) jars and cooking pots with local linked-triangle designs. These latter Jōmon-lineage ceramics formed the majority at Oki II, indicating the context of the beginning of the ceramic transition, which is marked by an increase in large jars (to 20% of the assemblage) (Shitara 2014, p. 455).

The Oki II and Iwabitsuyama styles were categorized as early Middle Yayoi by Watanabe (1986); Shitara (2006) places Oki together with Dōyama 堂山 site in Kanagawa in the terminal Early Yayoi (I-new), but Iwabitsuyama succeeding Oki in early Middle Yayoi (II). Table 1 presents the chronological ordering in Shitara (2006); the Iwabitsu, Jinbo Fujitsuka, and Tatsumichō styles for Gunma are pictured in Figures 5 and 6.

What these ceramic data suggest is that changes in the pottery repertoire were the first step of Yayoinization and that the Yayoi ‘package’ did not initially exceed the boundary of the Waist of Honshu even though local peoples (of Jōmon lineage) in the Owari Plain invented new styles (Kashiō, Suijinbira) in response to the Yayoi Ongagawa-style pottery in the west, using *jōkonmon* surface finishing and modification of shapes (jars made from cooking pot shapes). These localized styles then were traded and/or influenced the development of similar *jōkonmon* ceramics in regions further east-north-east (Kōri, Oki, Dōyama). In many places, these new type vessels were used contemporaneously with local Jōmon-lineage vessels bearing traditional decoration (linked triangles, zoned cord-marking). In the western Kantō region, most of the transitional ceramics occur as secondary burial jars together with local Jōmon-lineage continuations.

## THE JŌMON–YAYOI TRANSITION IN EASTERN JAPAN

Table 1. Contemporaneous Early–Middle Yayoi ceramics in eastern Japan compared with the standard Yayoi in Kinki (extracted from Shitara 2006, table 1; Shitara 2014, table 1 gives a slightly different line-up of ceramic names). **Bold**=appear in Gunma

KINKI	TŌKAI	CENTRAL HIGHLANDS	NORTH KANTŌ	SOUTH-WEST KANTŌ	SOUTHERN TŌHOKU
Early Yayoi (EY)					
I-old+Nagahara	Mamizuka	Kōri I-old	Chiami	Chiami	Ōbora A <sub>2</sub>
I-middle +Nagahara	<b>Ongagawa</b> +Kashiō	Kōri I-mid-new	<b>Chiami</b>	Chiami	Ōbora A'
I-new+Nagahara	Ongagawa + <b>Suijinbira</b>	<b>Kōri II</b>	<b>Oki</b>	Dōyama	Miyota
Middle Yayoi (MY)					
II	Asahi +Yaname	Shōnohata	<b>(Iwabitsuyama)</b>	Dōyama	Imaizumi
	Kaidachō	Teradoko	<b>Jinbo Fujitsuka</b>	Hirazawa(Asobigasaki)	Ryūmonji
III	Kaidachō	Ajima	Ikegami	Nakazato*	Minami-miyama
IV	Takakura	<b>Kuribayashi</b>	Kitajima** [ <b>Tatsumichō</b> ]***	Miyanodai	Kawaharachō-guchi

\* Nakazato is placed in second half of Middle Yayoi III by Kanagawa Kyōi 2012.

\*\* From Saitama, parallel to Tatsumichō-style pottery in Gunma

\*\*\* The new view is that Tatsumichō-style is the same as Kuribayashi-style pottery (S. Ooki pers. comm. 16may'19).

### 2.2 The burial evidence

From late Early through mid-Middle Yayoi, the broad *jōkonmon* ceramic sphere was concomitant with the distribution of secondary burials, practiced from the Tōkai to southern Tōhoku regions. Shitara comments that this burial tradition conforms both to the Final Jōmon distribution of grooved *fusenmon*-decorated pottery and to the Early Yayoi distribution of *jōkonmon*-finished pottery (Shitara 2006, p. 110). Hudson (1992) gave an overview of Yayoi secondary burials and described the process of cleaning the bones for redeposit (cf. also Shitara 1988, 1991, 2006, pp. 110–120).

#### 2.2.1 Secondary burial locations in Gunma

The locations of Yayoi secondary burials in Gunma Prefecture are shown in Figure 7, with their data presented in Table 2. Most of the secondary burials are interred in jars within burial pits; however, at Yatsuhagi, no jars were used but the bones simply deposited in the cave, while at Iwatsubo, primary (not secondary) burials of flexed skeletons in the Jōmon tradition were recovered as described above. These burials might be considered as a prelude to exhuming the bones and reburying them in jars, but this is not attested at the site (Iijima *et al.* 1994, p. 12).



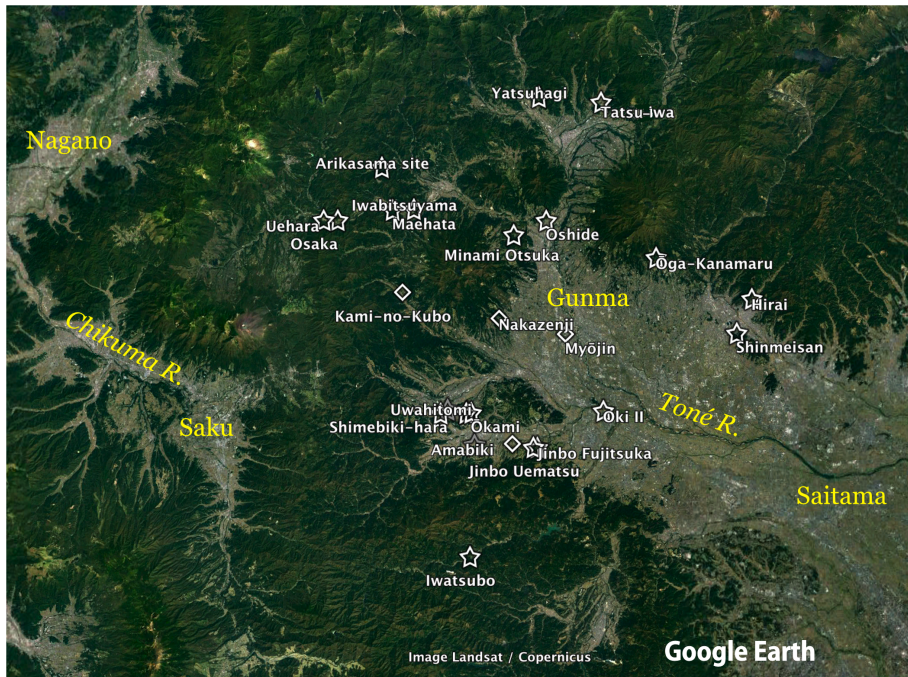


Figure 7. Locations of Early~Middle Yayoi secondary burials in Gunma Prefecture (compiled by author, background courtesy of Google Earth)

Most secondary burials in Gunma are jar burials located at lower elevations, generally less than 500m msl. However, several are located at greater elevations than 500m msl. (Table 2). For comparative purposes, it is useful to know that the confluence of the Toné and Agatsuma Rivers, near Oshide 押手 site in the far north-western corner the Kantō Plain, is about 220m msl, and the Toné when passing the Oki 沖 II site is at ca. 60m msl (Figure 7). Thus, the plain drops rapidly within 22km from north-west to south-east. Terraces border the river and footslopes rise up to Mt Haruna on the west and Mt Akagi on the east.

### 2.2.2 Landform classification for secondary burials

Rather than mere altitude, a better classification of sites can be developed based on landform location:

- MT (high mountain): the four sites in this category, Arigasayama 有笠山, Iwabitsuyama, Yatsuhagi 八束脛, and Oga-Kanamaru 大胡金丸 are indeed high on the mountainsides and consist of caves or rock shelters. The initial three listed were some of the first discovered—or long known in the region. Because their remains were so spectacular, they conditioned the image of secondary burials being in isolated, inaccessible places. These three sites date from Early Yayoi to early Middle Yayoi.



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Table 2. Yayoi-period Secondary Burials in Gunma

Site		Date ceramics	Alt.	Loc.
Osaka*	尾坂	tFJ, 1½MY	738	MV
Shimebiki-bara I	注連引原	EYI Ongagawa-old, -newfusenmon, Ōbora(A?)	238	TR
Kami(no)kubo	上(ノ)久保	2½EY pre-Iwabitsuyama (Suijinbira)	590	MV
Shimebiki-bara II	注連引原	tEYI-old~MYII-new Kinai-kei	238	TR
Minami Ōtsuka	南大塚	tEYI	440	HS
Uwahitomi	上人見	tEYI Iwabitsuyama Suijinbira	751	TR
Iwabitsuyama (Takanosu) (Makuiwa)	岩櫃山 (鷹ノ巣) (幕岩)	tEYI Iwabitsuyama (Maruko)	775	MT
Oshide	押手	tEY Ongagawa I-mid Suijinbira-old	?	HS
Oki II	沖II	tEYI ~bMY Iwabitsuyama, Suijinbira, Maruko	69	AL
Uehara I	上原	tEY	642	MV
Ōgo-Kanamaru	大胡金丸	Iwabitsuyama	420	MT
Maehata	前畑	Iwabitsuyama	428	MV
Nakazenji	中善地	Iwabitsuyama+ (Suwada)	300	HS
Arigasayama #2	有笠山	1½MY	884	MT
Iwatsubo Cave	岩津保	1½MY (Nozawa I)	394	MV
Hirai	平井	MY (Nozawa I)	180	HS
Nakanoya-hara	中野谷原	MYII-old	265	TR
Shimebiki-hara II	注連引原	MYII-old	238	TR
Ōkami	大上	MYII	428	TR
Yatsuhagi Caves	八束脛	1½MY Kuribayashi 1~2-old, Nozawa II, Suwada	650	MT
Tanakada	田中田	1½MY	164	HS
Myōjin	明神	1½MY	115	—
Jinbo Fujitsuka	神保富士塚	MYIII Jinbo Fujitsuka	170	TR
Tatsu-iwa	立岩	MY (Yamasōka)	542	HS
Minami Ōtsuka	南大塚	MY	440	HS
Kannon-mae	観音前	MY	173	TR
Shinmeisan	神明山	MY	143	HS

Notes: All sites had *jōkonmon* pottery; named styles appear below without parentheses; imported or copied ceramics in parentheses; 1½=first half; 2½=second half; Sources are listed in Site Appendix bibliography

\* not the city of Ōsaka 大阪 which is often spelled without the macron

- MV (mountain valley): these sites are indeed in the deep mountains but tend to be located at lower elevations near the river terraces: Maehata 前畑, Kami(no)kubo, Iwatsubo 岩津保 and Osaka 尾坂. The first three sites are all terminal Early Yayoi or beginning Middle Yayoi; Osaka has yielded both Final Jōmon and early Middle Yayoi ceramics.
- HS (hillside): these sites occur on hillslopes or volcano flanks very close to basin bottomland. They span two time periods: from Minami Ōtsuka 南大塚, Nakazenji 中善地, and Hirai 平井 in terminal Early Yayoi (tEY)~beginning Middle Yayoi (bMY); and Minami Ōtsuka continuing into Middle Yayoi along with Shinmeisan 神明山 and Oshide 押手 (EYI-mid).
- TR (terrace): sites on terraces begin with Shimebiki-hara 注連引原 in the earliest Early Yayoi (I-old); this site is dated earlier than what is commonly thought to be Early Yayoi, commencing with Oki and Iwabitsuyama-style pottery in EY(I-new). As such it needs further research. But it is clear that the Shimebiki-hara site area became an important Yayoi site in the basin, with Shimebiki-hara II adjoining it from EY(I-new), and Okami 大上 nearby in MY(II). This site cluster on the upper terrace at the edge of the foothills of the Usui River contrasts with another cluster of sites to the west and closer to the edge of the same terrace: Uwahitomi 上人見 (tEY) and Nakanoya-hara 中野谷原 (bMY).

### 2.2.3 Burial contents & sources

Early analyses of the jar burial contents were focussed on the human remains—not just bones but perforated teeth and fingerbone pendants (e.g. Aramaki *et al.* 1988; Toyama *et al.* 1989). Such remains have been recovered from several sites throughout Japan from southern Tōhoku to Okinawa at Jōmon and Early to Middle Yayoi sites (Toyama *et al.* 1989, p. 2–3).

Two of the secondary burial sites, Iwatsubo Cave (1½MY) and Yatsuhagi Cave (2½MY), yielded cranial remains that had been subject to tooth extractions. This is recognized as a Western Yayoi tradition and is taken by investigators to indicate either migrants or locals who had adopted the practice. Nagai (2007, p. 27) assumed that the people making and using *jōkonmon*-finished pottery were local natives who had contacts and relationships with others throughout the ‘network’ defined by the Final Jōmon grooved *fusenmon*-decorated pottery (Nagai 2007, p. 27). However, analyses of crania and teeth from two individuals in the Iwatsubo Cave burials revealed one female was local while one male was of admixed type (Kaifu 1992; Matsumura 2001). This pattern was repeated several centuries later in the Kofun Period at nearby Kanai Higashi-ura site, where skeletal morphology indicated a male of admixed descent and a female of native descent; strontium isotopic analysis further revealed that both had migrated into the Gunma region from the west (Sugiyama 2019, p. 176). Thus, migration of peoples from west to east, in however small numbers, cannot be denied for the Early Yayoi period; and according to Matsumura’s reckoning, by the Kofun period 72% of his 83 samples were of admixed type.

Other artifacts in Early Yayoi also give indications of distant communications. Even the assemblage from Arigasayama Cave #2 included a shell pendant alongside a local bead made of pumice and fingerbone pendants perhaps of a relative (Iijima *et al.* 1994). Gunma being one of the few land-locked prefectures in Japan, any sea products that appear there are automatically indicative of long-distance trade, whether direct or down-the-line. The contemporaneous Iwatsubo Cave, in addition to Western Yayoi-style tooth extractions, also yielded shell bracelets, a southern product; deer antlers were placed upon one grave, implying both hunting and ritual. An increase in the scale and sophistication of grave deposits through time can be seen: the Yatsuhagi Caves, dating to the first half of Middle Yayoi, had not only fingerbone but teeth pendants, both shell bracelets and shell beads, not only animal products but a boar tusk ornament—and finally jasper tools and cylindrical beads reflecting trade relations with the bead-making villages or beadstone source areas of the Japan Sea Coast to the northwest of Gunma. Multi-directional communications are repeated in the types of ceramics found in the burial sites, either as burial jars themselves or accompanying vessels.

#### 2.2.4 Pottery communications

The types of artefacts found in and with these burials attest to communications with other groups in the region. Here I use local routes through the mountains to postulate relations between Gunma and other areas. Such routes are known to be very long-lived, since they are proven passages through difficult terrain; Ooki (2019) gives the names of the significant mountain passes. The connections between Gunma and the west, for example, were formalized in the Tōsandō administrative road in the Nara–Heian periods and incorporated into the Nakasendō in the early Edo period. This focus on geography is necessary because pots do not move magically across the landscape: prehistorically, they had to have been carried by people, whether over very long distances or successive short ones. People travel on paths, or by boat on rivers and along coastlines; thus, it is necessary to anchor movements on the ground. This will be borne out by examining late Middle Yayoi developments as well, at the end of this article.

One of the earliest Yayoi sites in Gunma, Kamikubo, yielded a Tōkai variety of *jōkonmon* pottery (Sujinbira); this conforms to the schema outlined above where *jōkonmon* pottery from the Tōkai was imported or influenced pottery during the Early Yayoi period in the east. The Kamikubo site is located deep in the mountains along the Karasu River. That river is followed today by Route 406 along an old road called Kusatsu Kaidō; thus at least in historical times, it was a way to travel from the Takasaki City area to Kusatsu Onsen (hot springs), and perhaps in earlier times the road extended beyond into Nagano Basin in the Chikuma River valley. It is exactly this area where *jōkonmon* pottery is thought to have been introduced into northwest Kantō (see the quote from Kanaseki & Sahara above, in Akazawa 1981, p. 241).

Iwabitsuyama is the type site for the beginning of Middle Yayoi in the north-western Kantō. However, among the three caves/rock shelters on the mountain, Cave B contained both Iwabitsuyama and Maruko-style pottery, the latter from Tōkai. Mt Iwabitsu is located inland on the Agatsuma River, which forms a passage north of Mt Haruna towards the west. This was probably a major route to the Nagano Basin on the Chikuma River, passing by Mt Kusatsu-Shirane. Today Route 145 runs along the river, meeting Route 406 coming in from Kamikubo before splitting to go north on Route 292 towards the Japan Sea or south on Route 144 towards the Saku Basin in the Chikuma River valley.

Nakazenji, also an early site, and Shinmeisan (MY) are on opposite sides of the Toné River basin, but the presence of Suwada-style pottery, characteristic of East Kantō, suggests ties down the Toné River towards Tokyo Bay, the river's original outlet. In the early 17<sup>th</sup> century, the Toné was diverted away from Tokyo to flow directly east into the Pacific Ocean, but prior to that, it would have connected the north-western and south-eastern ends of Kantō. Suwada pottery is the type pottery for the Early Yayoi in East Kantō, excavated and identified at the Suwada site in Ichikawa City, Chiba, close to the mouth of the former Toné River at the head of Tokyo Bay. *Jōkonmon*-finish was first identified on Suwada pottery, and Iwabitsuyama ceramics came to be considered an early regional variation of Suwada (Watanabe 1986); more recently the Suwada style is broken down into the later Hirazawa style, Jinbo Fujitsuka style, and Ikegami style (Gunma Maibun 2019). Now, however, it is thought that the influences of *jōkonmon*-finish came into the Kantō from different directions (Nagai 2007), but the existence of Suwada- and Iwabitsuyama-style ceramics together at the Nakazanji site point to the Toné River valley as a route of communication from inland Kantō to Tokyo Bay.

The two sites of Hirai and Iwatsubo sit on opposite sides of the Gunma plains but both have pottery/influence from northern Kantō. The Nozawa 野沢 site, located today in northwestern Utsunomiya City, Tochigi, was a Jōmon site where Middle Yayoi jar burials were discovered in the late 19<sup>th</sup> century. Nozawa I (MY) pottery was imported into the Hirai site, and the pottery of the Iwatsubo site shows influences from Nozawa I. Hirai is close to the back route to Nozawa, from Kiryū around the mountains to the west of Utsunomiya, while Iwatsubo is located in a deep mountain valley that leads into Yamanashi Prefecture. Route 462 to the west today leads into a tunnel just after the Iwatsubo cave site; but the old road, Jukkoku-tōge Kaidō, follows the river on the opposite site, where the shrine that now sits in the mouth of the cave could be seen from across the river. This route leads into the Saku Basin in the Chikuma River valley; it is said the road derives its name (“10-*koku* Pass”) from the need to carry many *koku* 石 (bushels, 1 *koku*=190 litres) of rice across the mountains from Nagano to supply the mountain villages of western Gunma.

The Yamasōka-style pottery that appears at the Tatsu-iwa site is distributed across southern Tōhoku to the Japan Sea Coast. The site's location at the northwest end of the Kantō Plains, near mountain passes that lead north into Aizu Basin in Fukushima or northwest to

the Niigata coast, was perfect for taking advantage of these routes of communication.

Finally, it is important to note that many of the burials incorporate both transitional *jōkonmon* pottery and Final Jōmon-lineage ceramic types, such as the perfect Final Jōmon pedestaled bowl included with the Minami Ōtsuka burial, possibly to hold food offerings for the dead. The Kantō region was not uninhabited when Western Yayoi traits began trickling in. People continuing the Final Jōmon lifestyle were the very ones to adopt these traits. In this sense it is ultimately counter-productive to treat transitional evidence in isolation from its Final Jōmon social context. This overlap is confusing but essential in recognizing the time-transgressive nature of the spread of Yayoi culture. In Gunma, Yayoi culture does not start until Jōmon-like pottery and pottery influenced by Yayoi styles begin to occur together in sites. And this may vary site by site.

In summary, the pottery and artifacts yielded by different secondary burial sites around the edge of the northwest Kantō Plains suggest that the various communities in the Early~mid-Middle Yayoi periods had distinct ties to different lands within the interaction network continuing from the Final Jōmon grooved *fusenmon*-decorated pottery sphere. Yayoinization began first by the local Jōmon-lineage residents in the area adopting the new methods of manufacturing pottery with *jōkonmon*-finish as developed in the Owari Bay region. Many *jōkonmon*-finish pot bases are fabric-impressed, suggesting that the continental craft of weaving cloth was also influencing lifestyles during the Jōmon–Yayoi transition.

### 2.3 The settlement evidence

It has been lamented over many decades that settlement sites were unknown for the people who practiced these secondary jar burials. However, surveys of the literature on the finds locations of Early Yayoi pottery (both *jōkonmon* and Ongagawa) suggest that they are closely related to Final Jōmon site locations (Noto & Kojima 1989, 2006). In their list of 21 Kantō find spots yielding imported Early Yayoi pottery, only four do not have Final Jōmon sites in the vicinity (Noto & Kojima 1989, table 1). The cave at Iwatsubo was discovered to have 4m of occupational fill from earlier Jōmon hunter-gatherers; it is notable that the burials in the uppermost layer, accompanied by early Middle Yayoi pottery, were not secondary jar burials but flexed primary burials in the Jōmon tradition, indicating cultural contact between remaining Jōmon-lineage populations in the area and incomers bringing new pottery styles (as documented at the Iwatsubo site discussed above).

Final Jōmon settlement patterns are very different from the large Middle Jōmon sites common to Chūbu and Kantō regions. Due to what is believed to have been a deterioration in climate, populations dispersed and settlement numbers decrease dramatically (e.g. Shitara 2006, p. 145). Habu notes that “most of these sites are not associated with any pit-dwellings or any other residential features, making any kind of analysis on settlement systems difficult” (Habu 2004, p. 259). Her conclusions are echoed more recently by KOBAYASHI



Seiji, who states that the clothing, food, and housing of the Early Yayoi presence in the Kantō region are still unclear, making this a “puzzling period” (Sakura-shi 2016, unpg.). The Kanagawa researchers say that nothing but bonfire/fireplace remains and sherd scatters have been recovered for sites with ceramics from Early Yayoi (I) and Middle Yayoi (II) phases (Kanagawa Kyōi 2012, p. 02). All these indicate a very transitory presence in the landscape.

### 2.3.1 Annaka City area

Already in the 1980s, the Annaka City area in Gunma became known for its transitional settlement evidence (evaluated by Shitara 2006). House remains have been discovered at the Shimebiki-hara sites in the late 1980s and in the last couple of years (Daikuhara 1987, 1988; Shitara 2006; Ojisan 2017). One rectangular, shallow house pit, dating to Early Yayoi (I-old), measured 5–6×6–7 m in size and had a hearth outlined with rocks on the house floor (Daikuhara 1987; Shitara 2006). Two other house pits measured 3.5 m square and 20 cm deep, and 3.2 m square and 6 cm deep. These were dated slightly later, to Yayoi I-new. One house had only a burned area for a hearth, interpreted as evidence for evanescent occupation (Shitara 2006 citing Kobayashi 2004). Then at Shimebiki-hara II, one shallow pit-building 3.5 m/side was dated to the first half of Middle Yayoi (Maebashi/Takasaki Kyōi 2013). Several structures with just postholes but not house pits were also present.

Interestingly, finds at the Shimebiki-hara I site were concentrated only in Yayoi I-old but not after that; at the adjacent site of Shimebiki-hara II, settlement began in Yayoi I-new but then tailed off in Yayoi II (Shitara 2006, table 3). The abandonment of house sites is reminiscent of the stop-start Yayoi presence in Kanagawa. It can be surmised that not much investment was made in house-building: populations were thought to be sparse and occupation transient. Surrounding a house(s) at Shimebiki-hara were 30 pits, some at least thought to be burials, arranged in an arc (Figure 8); three large oval pits had considerable pottery and stone tools, while other irregularly shaped ones were less provisioned.

At the Ōkami 大上 site (Inoue *et al.* 2003; Shitara 2006), a kilometre or so from Shimebiki-hara, three house pits and a surface structure were excavated two decades ago (Inoue *et al.* 2003; Shitara 2006). The house pits measured 3.2×5 m and (2.6)×3 m, and were 1–15 cm deep. All had hearths on the floor, one surrounded by rocks in one pit-house. These dated to Middle Yayoi II, slightly later than Shimebiki-hara.

About 7 km west of the above sites but still in Annaka City are the Uwahitomi terminal Early Yayoi (I) secondary burial site and the Nakanoya-hara settlement where 15 pit-houses and 10 pits were excavated in the early 2000s (Figure 9). The house pits were ca. 10 cm deep and mostly oval or circular in shape; hearths were either burned floor areas or had stone surrounds. These dated to the beginning of Middle Yayoi (II-old).

South-east of Annaka in Takasaki City are the Jinbo 神保 sites, positioned in the terraced rolling uplands south of the Kabura River. The Jinbo Uematsu 神保植松 site yielded three

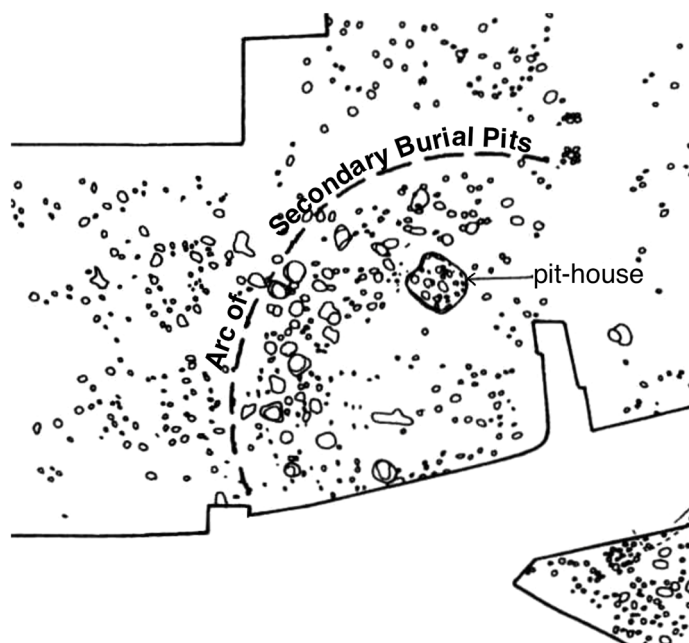


Figure 8. Pit-house at Shimebiki site surrounded by an arc of secondary jar burials (after Shitara 2006, fig. 2, modified by author)



Figure 9. Ephemeral pit-houses at Nakanoya-hara (after Shitara 2006, fig. 1, modified by author)

pit-buildings dating to Middle Yayoi (II~early III), of which two measured ca. 4.2 m square with house pits 4 and 30 cm deep. They were equipped with floor hearths. Jinbo Fujitsuka 神保富士塚 nearby consisted of 77 pits dating to mid-Middle Yayoi (III). At least pits #705 and #706 are thought to be secondary burials as they occurred in close proximity to house #67. Shitara (2006) assumes these features form a household unit.

### 2.3.2 Agatsuma River area

For the past 25 years, excavations for the Yanba Dam construction have been conducted along the Agatsuma River, one of the main passages west from Gunma to Nagano on the northern side of Mt Haruna, as discussed above. In approximately a 14 km stretch of narrow valley, 66 sites ranging in date between 14,000 years ago and the Tenmei 3 (1783) lahar were discovered (GARF 2018; cf. Soda 2019). A public presentation of the results describes details for 33 of those sites, among which 24 had remains from the Yayoi period (Table 3).

Significantly, the major Jōmon occupation of the area dated from Early to Late Jōmon, with only two long-occupied settlements, Yokokabe Nakamura 横壁中村 and Ishikawa-hara 石川原. The former carried on into the Kofun period while the latter was abandoned after early Middle Yayoi. Several other sites (10) began with terminal Final Jōmon ceramics (Chiami and Kōri styles) leading into the Yayoi period, suggesting new occupation of this area, perhaps radiating out from the two existing Final Jōmon settlements. Naganohara-Ipponmatsu is the only site established in the Final Jōmon to persist through to the Kofun period. Again, there is a pattern of stop-start settlement occupation in this area, which is also characteristic of the greater Gunma area for Yayoi IV, V, and Early Kofun (GARF 2018: table, pp. 8–9).

The Yayoi sites in the Yanba Dam area date from Middle through Late Yayoi. Their dating distributions are listed in Table 3. It is important to note that Early Yayoi (YI) finds (signified by Oki II style ceramics) are not identified in this work. Oki II style of ceramics, however, are often found in conjunction with Final Jōmon pottery as discussed above. Thus, it is possible that the Chiami and Kōri styles of terminal Final Jōmon, common in the Agatsuma River drainage, may have been contemporaneous with Oki II ceramics found elsewhere (especially in secondary jar burials).

The patterns of Yayoi occupation of this region of the Agatsuma River drainage indicated in Table 3 are illuminating. Of the 24 Yayoi sites identified, 13 had prior Jōmon ceramics but only three carried on into the Kofun Period. A full 14 Yayoi sites were abandoned at the beginning of late Middle Yayoi, when irrigated rice agriculture was established in the region as we shall see below. Ten of the sites were occupied during the whole of Middle Yayoi, but of these, six were abandoned thereafter. The remaining four Middle Yayoi sites continued into Late Yayoi—while another site was reoccupied in Late Yayoi after a hiatus during the late MY, and two new Late Yayoi sites were established at locales without previous occupation.

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Table 3. Dates of Final Jōmon to Kofun-period sites discovered in the Yanba Dam excavations along the Agatsuma River (extracted from GARF 2018, pp. 8–9)

	M-L-F Jōmon	terminal FJ	1½MY	2½MY	LY	Kofun
Yokokabe-Nakamura	+	Angyō Chiami Kōri	+	+	+	+
Ishikawa-hara	+	ACK	+			
Naganohara-Ipponmatsu	長野原一本松	CK	+	+	+	+
Datsume I	立馬	CK	+	+	+	
Uehara IV	上原	CK	+			
Kawarayu Katsunuma	川原湯川沼	CK	+			+
Shimohara	下原	K	+			
Sai-no-kami	幸神	K	+			
Ue-no-daira I	上ノ平	K	+			
Yokokabe-Katsunuma	横壁勝沼	K	+			
Sanpei I, II	三平	K	+	+		
Nishikubo I	西久保	K	+	+	+	
Osaka	尾坂	K	+		+	
Kugudo	久々戸	K	+			
Yamane III	山根		+			
Uehara I	上原		+			
Niregi II	楡木		+	+		
Niregi III	楡木		+	+		
Hayashi Nakahara II	林中原		*	+		
Datsume II	立馬		+	+		
Datsume III	立馬		+	+		
Shimoda	下田		+			
Hayashi Nakahara I	林中原				+	
Ishihata I Iwakage	石畑岩陰				+	

+ = Yayoi remains; \* = pit-building; shading = unoccupied

Thus, the steep valley flanks were heavily utilized in the terminal Final Jōmon and early Middle Yayoi, but despite the arrival of irrigated rice agriculture in late Middle Yayoi, sites were mainly abandoned thereafter. The few Late Yayoi settlements consisted of very long occupied sites (since terminal Final Jōmon) and newly founded or reoccupied sites.

Only two Yayoi pit-buildings were discovered among the 24 Yayoi sites identified. One at Hayashi Nakahara II site, on a river terrace, was built without prior occupation of the spot, and the site lasted through Middle Yayoi. The second was at Datsume I site, on a hill promontory, about .75 km distant from Hayashi Nakahara. This hilltop had been occupied from terminal Final Jōmon, and there was an additional pit-building that was dated to the Chiami ceramic phase. Datsume I was occupied longer, from terminal Jōmon through Late Yayoi. Four other sites dating to early Middle Yayoi had unnamed features, but most of the finds at the Yayoi sites were varying quantities of pottery. With this intensive excavation throughout the dam site area, the temporal spans and the natures of the sites are seemingly fairly representative. We can conclude that the valley was heavily used during the Jōmon–Yayoi transition but occupation was light thereafter, probably due to the lack of good land for paddy fields.

### 2.3.3 Comparatives

In 2005, Noto and Kojima published their survey of Ongagawa pottery finds (Early Yayoi) in the Tōhoku region, including in their sample copies of Ongagawa vessels. They concluded that such sites are located at spots close to small streams in hilly regions in the vicinity of Final Jōmon sites—paralleling the data for Kantō. Although all sites were positioned where rice could be grown, only six were positioned where rice agriculture could be expanded. The authors conclude that the Ongagawa pottery find spots were not indicative of site selection based on agricultural potential but that they represented Final Jōmon communities which received actual imported pottery or copies thereof. Most of such sites did not continue beyond that stage: later sites where rice agriculture was thought to have been undertaken are in different locations. Noto assumes that it was Jōmon-lineage people who gradually developed rice agriculture in the Kantō and Tōhoku regions *without migration*, re-locating their villages to take advantage of better agricultural potential. This view harks back to the original hypothesis (in Akazawa 1981, 1982) that migration of Yayoi admixed people out of Kyushu stopped at the Waist of Honshū.

Shitara (2006) reviews the evidence of Early Yayoi and early Middle Yayoi sites in both Gunma and Nagano Prefectures within the context of the wider finds of more than 100 Yayoi secondary jar burial sites in the Kantō but few settlement remains. He concludes that these sites support the hypothesis of ISHIKAWA Hideshi, who postulated that concentrated jar burial sites served a wider community of small hamlets whose residents congregated to deposit their dead. That the house remains were shallow pits or surface structures, poorly equipped and insubstantial, stimulated him to consider not only a dispersed settlement pattern of a few



houses each but their transience. This brought Ishikawa to propose a mobile subsistence system incorporating swidden agriculture, a hypothesis which Shitara then tested, reviewed below.

## 2.4 The subsistence evidence

The Ongagawa style, which was initially utilized as documenting the spread of rice agriculture, is now more accurately referred to as Itazuke-style pottery. Ongagawa-old pottery (=Itazuke IIa) of the Early Yayoi (I) period has been discovered in Kanagawa Prefecture *separately* from the Yayoi ‘package’ of material culture at the Hirasawa-Dōmei 平沢同明, Yagashira 矢頭, and Naka-yashiki 中屋敷 sites. Local ceramics belonged to the Jōmon-lineage grooved *fusenmon*-decorated pottery. Naka-yashiki has yielded rice and both millets, while pottery from the Uemura site has rice-husk impressions (Kanagawa Kyōi 2012). These reflect the cropping of grains by people who were still following a Jōmon-style broad-spectrum subsistence base (*anra-teki seigyō ruikei* 網羅的生業類型). The telltale signs of the beginnings of Yayoinization—increase of jar numbers and enlargement of stone hoes (Shitara 2014)—were not to be seen. These material items appear, along with the use of figurine-pots, in the Kōri II ceramic phase under the influence of *jōkonmon*-finish Suijinbira-style pottery from the Tōkai region in Itazuke II-c times (Shitara 2014, table 1; and Table 1 above). Thus, these sites clearly suggest Jōmon communities were starting to adopt agricultural lifeways, as well as ceramic technology, incrementally within the formal Yayoi period. Table 4 lays out the current evidence for transitional crops in Gunma, Kanagawa, Saitama, Yamanashi and Nagano Prefectures.

In Kanagawa, residential remains are not found for transitional sites, which are usually located at the edge of uplands or in the deep mountains as at Uemura (cf. map I-1 in Kanagawa Kyōi 2012), as attested above for both the Kantō in general and Tōhoku regions. For both coastal Kanagawa and land-locked Gunma, traditional Jōmon subsistence practices continued alongside casual cropping: deep-sea fishing is seen to have continued into Middle-Yayoi Kanagawa sites (Shitara 2006, p. 142), while Gunma has evidence of continued hunting. Beads made of boar tusk were recovered from the Yahatsugi cave burials, dating to the first half of Middle Yayoi; and deer antlers, boar tusks, and burned animal bones were recovered from three different burned-earth hearth areas in Cave #1 at Arigasayama. These occupational areas within the cave mouth may have functioned as temporary hunting camps during the second half of Middle Yayoi, *after* the introduction of irrigated rice.

Shitara and Takashe [*sic*] (2014) undertook an examination of grain impressions on the surfaces and interior voids of Final Jomon to Early and Middle Yayoi ceramic bodies from Gunma, Saitama, and Kanagawa Prefectures. For comparative purposes in Gunma, they chose Late–Final Jōmon sherds from the Nishi-arai 西新井 site in Maebashi City and sherds from the Nakanoya-hara site in Annaka City, discussed above, dating to early Middle Yayoi (1½MY). Whereas *none* of the Jōmon sherds had grain impressions or voids (unlike

Table 4. Finds of grain from Jōmon–Yayoi transition in Chūbu–Kantō prefectures (collated from Shitara 2006; Shitara 2014; Shitara & Takashe 2014; Kanagawa Kyōi 2012; Odawara-shi Kyōi 2017; Fujio 2017; Shindō 2011; Ooki pers. comm. 16may'19)

Site (pref)	Site characters	Period (Shitara&others)	rice	awa Setaria	kibi Panicum
Nishi-arai (G)	西新井	L-FJ	—	—	—
Shimoppara (K)	下原	FJ	+		
(Nagano)		FJ		+	+
Shimo-ōtsukimine (K)	下大槻峯	tFJ		+	+
Nakazato (K)	中里	tFJ		+	+
(Saitama)		FJ/EY	1	+	+
(Kanagawa)		FJ/EY	1	+	+
Jōshikimen (S)	上敷免	FJ/EY		+	+
Oshide	押出	EYmid-I**	+		
Kōri (N)	氷	EYI-new		+	+
Nakayashiki (K) #9 pit	中屋敷	[4c BC]{tYI}	393	ca. 2000	26
Uemura (K)	上村	{tYI}	+		
Minami Ōtsuka (G)	南大塚	[[YI Ongagawa]]	+		
Kami-nakamaru (Y)	上中丸	tEY	+		+
Takizawa (Y)	滝沢	2½EY	+		
Okii II (G)*	沖	2½EY–bMY	1	8	13
Iida B (Y)	飯田	bMY	+	+	
Nakanoya-hara (G)*	中野谷原	1½MY	3 3	17 4	25 9
Nakazato-hara (G)	中里原	mMY		+	+
Kannon-mae (G)*	観音前	mMY		+	+
Shagūji-hara (G)	社宮寺原	mMY	+		
Iida B (Y)	飯田	mMY		+	+
Sakaikubo (N)	境窪	mMY	+	+	+
Gotanda (N)	五反田	mMY	+	+	+
Ōtsuka (N)	大塚	mMY~	+	+	
Agata-machi (N)	県町	‘2½MY’		+	
Takasaki Keibajō (G)	高崎競馬場	[[2½MY]]	+++		
Kurokawa Kozuka (G)	黒川小塚	“2½MY”	+++		

G=Gunma (shaded), K=Kanagawa, N=Nagano, S=Saitama, Y=Yamanashi; period abbreviations as above; dates from Shitara publications, and Kanagawa Kyōi 2012 and others; absolute grain numbers=impression/void counts

\* sites listed in Table 2 as having secondary jar burials

{ } dates from Kanagawa Kyōi 2012

\*\* data on Oshide from Noto & Kojima 1989, p. 19

[ ] date by Ishikawa via Fujio 2017; [[ ]] date by Ooki pers. comm.

‘ ’ date from Nagano-shi Kyōi; “ ” date by Hirosaki University (Tomioka City 2018)

sherds from the Uemura site in Kanagawa), the Nakanoya-hara sherds had an abundance of *awa* 粟 (foxtail millet, *Setaria Italica*) impressions/voids (17), and *kibi* 黍 (common millet, *Panicum miliaceum*) impressions/voids (25) as opposed to rice (*Oryza sativa*) (3); also in evidence were *Perilla* (1) and beans (1). Sites in Kanagawa and Saitama that straddled the Final Jōmon/Early Yayoi divide had far fewer finds as might be expected from their earlier dating, but they still produced either *kibi* or *awa*, and only one rice husk impression. The analysts report both millet types occurring on Kōri I-new sherds (Final Jōmon) in the central highlands, equivalent to Early Yayoi I-middle (cf. Table 1 above); and they postulate their spread thereafter.

Baba and Endo (2017) have investigated this problem further, testing grain/seed impressions/voids in different types of ceramics and collating data from central Japan. As of their publication, there were no rice impressions/voids in the Final Jōmon grooved *fusenmon*-decorated pottery in the central highlands (Chūbu), but both rice and millet occurred together at most sites from the mid-Middle to late-Middle Yayoi (Kuribayashi-style) and Late Yayoi (Hakoshimizu-style) of the Chikuma River valley in Nagano Prefecture. Baba (2018) dates Kuribayashi-style pottery to 225 BC–AD 0.

Obviously, there are problems with sampling sizes and site preservation biases, but it is fairly clear from even these meagre but very welcome data that grains arrived in Kantō at the same time as *jōkonmon* pottery influence from the central highlands—except for in Kanagawa where the crops seem even to precede *jōkonmon*. Iwabitsuyama-style pottery has not yet been found in conjunction with rice (S. Ooki, pers. comm. 16may'19), but at the Oshide site in Gunma, dating one stage earlier than Iwabitsuyama, one of the rare Ongagawa pots had an impression of rice still in its husk. Sparse early evidence gives way to finds of modicums of rice in early Middle Yayoi (1½MY). This is the phase of Jinbo Fujitsuka-style pottery in Gunma, provisionally dated to 2–1c BC (S. Ooki, pers. comm. 16may'19); these ceramics are still decorated with Jōmon motifs and *jōkonmon* finish.

By mid-Middle Yayoi (mMY), at least two of the three grains (rice, *awa*, *kibi*) were recovered from sites in Gunma, Yamanashi, and Nagano. The millets, beans, and soybeans are all dry-field crops, so they could be grown without irrigation. But very few dry-fields are known archaeologically. Ridged garden features are known from Early Yayoi sites in Fukuoka Prefecture (Kyushu) and Mie Prefecture (just west of the Waist of Honshu) (Shitara 2014, p. 462). In Gunma, with its multiple layers of tephra cover, ridge-and-furrow occur at the Arima site under Asama-C tephra, thus earlier than the late 3<sup>rd</sup> century AD (Sakaguchi 2010). Two different forms of ridged fields are known from the Kofun Period onwards in Gunma, and evidence of dry-fields is known throughout western Japan for the early historic and medieval periods (e.g. Kuwahata 2019; Noto & Barnes 2019). It is a matter of time for more information to be forthcoming on non-rice agriculture.

Though it appears from Table 4 that dry-field farming was initially more easily adopted

than rice agriculture during the Jōmon-Yayoi transition in the Kantō, the question whether swidden techniques were used must be delayed yet again for solving later. The case study of the Kumakura 熊倉 site is a good example of the types of problems encountered in determining swidden agriculture (see Noto & Barnes 2019). Shitara (2014, p. 462) suggests that the concentration on rice and *Setaria* millet (*awa*) rather than *Panicum* millet (*kibi*) at the coastal Nakayashiki site in Kanagawa was determined by problems in upland fertility—as both rice and *Setaria* are moist-area crops while *Panicum* is suited to more arid regimes. His evaluation may well be appropriate for the Kantō region where uplands are host to tephrogenic andosols that pose great problems for farming (see Barnes 2019; Noto & Barnes 2019). If skeletal material was tested for carbon isotope distribution, we might see a differential in individual eating habits such as at the Early Neolithic site of Jiahu on the China Mainland where one individual was found to be a C<sub>4</sub> millet eater among a community of C<sub>3</sub> rice eaters (Hu *et al.* 2006).

From excavations in Kanagawa and Gunma Prefectures, we now know that irrigated paddy-field agriculture was instigated in mid-Middle Yayoi in north-western and south-western Kantō. Kanagawa is an interesting case study in this regard: multiple cases of migrants establishing rice agriculture through the Middle and Late Yayoi period are known, but the sites established did not necessarily continue. The Nakazato 中里 site, established by migrants from the west in the second half of Yayoi III (ca. 250 cal. BC), survived only about a century (Kanagawa Kyōi 2012; Odawara-shi Kyōi 2017). Agricultural villages again flourished in the latter half of Middle Yayoi (IV) but then again disappeared. Finally in Late Yayoi (V), Yayoi culture was reintroduced into Kanagawa, but even then, some sites like Kanzaki were occupied only temporarily, and many sites established thereafter did not survive into the Kofun Period (Kanagawa 2012, table V-10). Having the technology did not necessarily ensure survival of the village; other factors may have been at work, as Kanagawa researchers wonder if there was a natural disaster which would account for these disappearances. Research on climate variations, assessed via  $\delta^{18}\text{O}$  in tree rings, may answer that question: “in the Late Yayoi...the magnitude of variation in precipitation was enlarged in the period of multi-decades, with the resulting prolonged flooding or drought accompanied by severe societal reactions” (Nakatsuka 2015, p. 30).

### 3. Late Middle Yayoi (2½III–IV) in north-west Kantō

The introduction of full irrigated rice agriculture into Gunma occurred in the second half of Middle Yayoi (mIII–IV). At least two sites (Kurokawa Kozuka 黒川小塚 and Takatsuki Keibajō 高崎競馬場, Table 4) have yielded substantial carbonized rice remains. According to a fairly recent assessment (Maebashi/Takasaka Kyōi 2013, unpg., my translation), the direction of introduction was from Nagano Prefecture:

Groups using Kuribayashi-style pottery—with a new combed design characteristic of northern Nagano Prefecture—arrived into Gunma in the mid-Yayoi period. These groups were unrelated to the local Jōmon-lineage cultures. Instead, they came from mature societies where new elements such as wood coffin burials and the production and distribution of Yayoi-type polished stone tools were apparent. Bronze ritual usage as in Western Yayoi is also noted. These migrants into Gunma possessed an advanced agricultural technology, and they established wet-rice fields in the heretofore unused terraces and stream valleys.

Recent excavations in Nagano at the Agata-machi 県町 site, however, have produced a Kurobayashi jar of *awa* (*Setaria*) that date to 46 BC–AD 59 (95.4%,  $2\sigma$ ) (Nagano-shi Kyōi 2018, p. 32). This suggests rice had not completely supplanted the traditional dry-farming of millets by this date.

Ceramics in the style of the Kuribayashi 栗林 site in Nagano were first discovered at the Tatsumichō 竜見町 site in Gunma and named Tatsumichō-style pottery. This style was dated from the late 3<sup>rd</sup> century to 0 AD (Nagano-shi Kyōi 2018). These Nagano-derived ceramics are distinctive in having combed designs applied clockwise without using a turntable; these techniques differ from Tōkai and Kinai combed pottery even though the designs are the same (Ooki 2001). Sites yielding such comb-pattern ceramics are focussed around the foot of Mt Haruna; sites across the Toné River to the east at the foot of Mt Akagi yield a very different ceramic set influenced *not* by pottery from Nagano but from South Kantō, East Kantō and Southern Tōhoku (Ooki 2001). The Toné River that runs through the centre of Gunma Prefecture thus seems to form a cultural boundary within Gunma from this time up until the beginning of the Kofun period, as proposed by Fujio (2017). In Late Yayoi (V), comb-pattern pottery spreads south to Yamanashi and Kanagawa Prefectures (Ooki 2001).

Tatsumichō-style ceramics were thought to have developed under the influence of Kuribayashi-style pottery from the Chikuma River region in Nagano Prefecture (Baba 2008), parallel to Kitajima-style ceramics in Saitama Prefecture (see Table 1 above). However, some researchers now consider Tatsumichō-style ceramics as an outdated name, preferring to consider them as a regional variety of Kuribayashi-style itself (Ooki 2001, p. 8). Baba has tracked the routes of influence of successive stages of Kuribayashi-style pottery into Gunma: the earlier Kuribayashi (1+2-old) transmitted around Mt Kusatsu Shirane in Yayoi III and coming into the Gunma basin via the Agatsuma River north of Mt Haruna (Figure 10). Then at the beginning of Yayoi IV, Kuribayashi 2-new pottery influence travels farther upstream to the Saku Basin on the Chikuma River before entering Gunma, coming in south of Mt Haruna (Figure 11).

It is notable that the Kuribayashi styles developed in northern Nagano near the Japan Sea



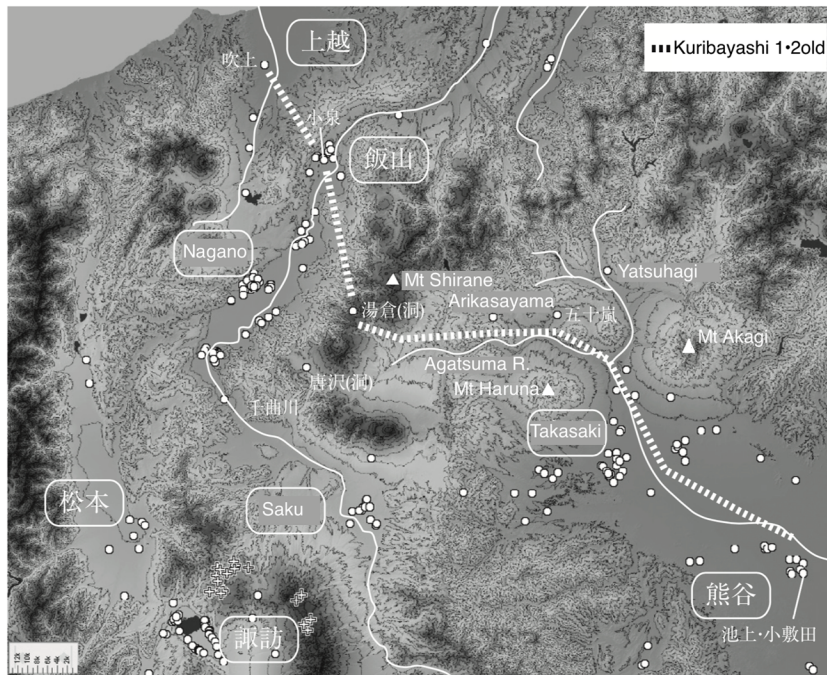


Figure 10. The route of introduction of older Kuribayashi-style pottery from Nagano into Gunma in Middle Yayoi (III) (after Baba 2008, fig. 22, modified by author)

coast and thereafter moved south upstream along the Chikuma River to the Saku basin. This is opposite the movement proposed by Ooki for the transmission of *jōkonmon* techniques from the Pacific seaboard up the Tenryū River into Nagano. The path of the Yayoi ‘package’ transmission to northern Nagano is not yet known, but a coastal dispersal seems likely from the geographical evidence.

As indicated above, it was not only the ceramics that changed, from *jōkonmon* to Kuribayashi-style; other elements of material culture were also new. A comparison with the earlier transitional cultural elements associated with Iwabitsuyama and Jinbo Fujitsuka-style ceramics (Table 5) suggests rapid and thorough cultural transformation accompanying Kuribayashi-style ceramics—to the extent that this must have been the introduction of the Yayoi package by migrants from Nagano. Not all Gunma archaeologists agree with this assessment, but it is difficult to imagine that the local post-Jōmon populace, even if sprinkled with a few migrants from Tōkai, were able to single-handedly adopt the western Yayoi lifestyle wholesale in such a short period with no outside help. I refer to this in Table 5 as a cultural replacement. However, it is notable that the initial stages of irrigated rice agriculture might have been paralleled for a short while by continuation of mountain hunting. At Arigasayama Cave #1, three occupational areas marked by burned earth and

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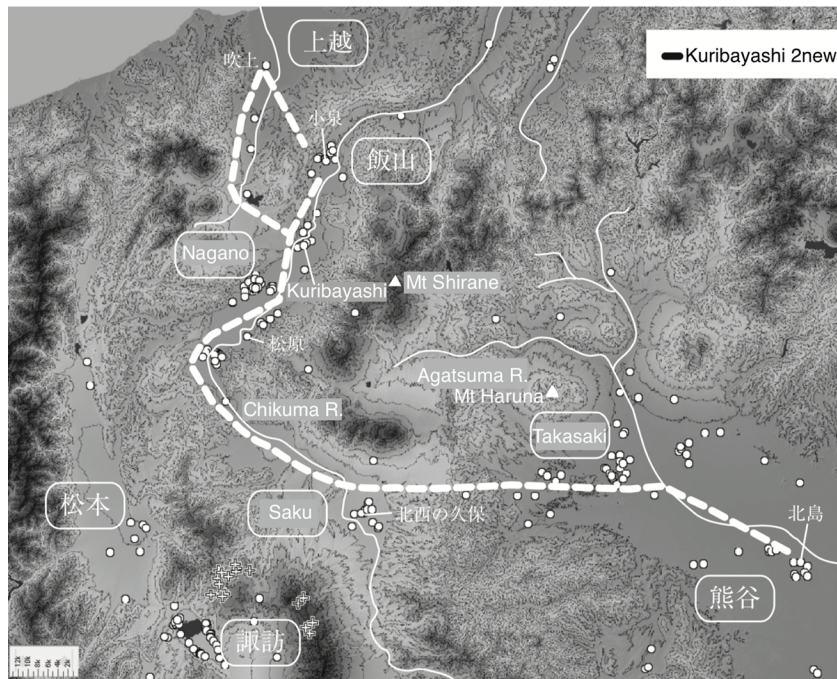


Figure 11. The route of introduction of newer Kuribayashi-style pottery from Nagano into Gunma at the beginning of late Middle Yayoi (IV) (after Baba 2008, fig. 23, modified by author)

Table 5. Comparison of jōkonmon-phase pottery (transitional phases) with Kuribayashi phase in Gunma (Gunma Maibun 2019); c=century

Pottery/ Attributes	Iwabitsuyama	Jinbo Fujitsuka	cultural replacement	Kuribayashi (Tatsumichō)
	end Early–1½ Middle Yayoi (II) ca. 5–3c BC	1½ Middle Yayoi (III) ca. 3–1c BC		2½ Middle Yayoi (IV) ca. 1c BC–AD 1c
pott surface	jōkonmon	jōkonmon		smooth
pott shapes	jars, pots, cylindrical bottles, bowls	+ lids		+ pedestals, perforated vessels=steamers?
pott dec	zoned cord-marking, linked triangles	deep incised patterns zoned cord-marking		red slip; incised wave, zig-zag, parallel lines
stone tools	large flaked hoes			polished axes
settlement	ephemeral	transitory		moated
burial	secondary	secondary		moated precincts*; cobble-floored, board-walled graves

\* small moated and mounded family(?) burial grounds widely used in the Kinai area of western Japan; first discovered in the Kantō region in 1984, but many identified thereafter have been reassessed as moats around building structures (Hosono 2019).

hearth(s) accompanied by Tatsumichō- (late Kurabayashi-) style pottery yielded burned deer and boar bones along with a polished stone axe—part of the Yayoi package tool kit.

The full explication of Tatsumichō-phase Yayoi occupation in Gunma has not yet been synthesized, but most elements of the Yayoi package are known piecemeal from different sites. Direct evidence of paddy fields dating to late Middle Yayoi in Gunma is rare. Paddies were excavated at the Middle Yayoi Ide 井出 site cluster in 2018 (not yet published), and footprints in mud next to a river at Nakagawa 中川 site are interpreted as made in rice-planting preparations (Takasaki/Maebashi Kyōi 2013). More recent excavations (not yet published) at the Takasaki Keibajō site yielded irrigation canals but not yet paddy fields. However, many sites yielding Tatsumichō-style pottery have produced other elements of western Yayoi culture: polished stone axes (superseding the large flaked hoes of the Jinbo Fujitsuka ceramic phase), a village moat at Takasaki Keibajō site, and a new type of burial known from Nagano consisting of a board-walled bottomless structure placed on a cobble bed (礫床墓 *rekijōbo*). With the importation of this new burial style and moated precinct burials, secondary jar burials ceased in late Middle Yayoi (Hosoda 2019).

#### 4. Discussion

When Yayoi farmers were colonizing lowlands in western Japan to practice wet-rice farming, peoples in the eastern and north-eastern regions of Japan still followed Jōmon lifestyles. There is a divergence of opinion in the research literature as to how to deal with these differences, and the dates offered by different authors are often in conflict:

- FUJIO Shin'ichiro maintains a Yayoi *period* beginning from the late 10<sup>th</sup> century BC that contains several different *cultures*, including phases of continuing Jōmon cultures—shorter in the west and longer in the east—until irrigated-rice agriculture is adopted. The irrigated-rice cultures are designated as continental-style Yayoi A in the west and Yayoi B in the east, with northern Tōhoku and Hokkaidō partitioned into Zoku/Epi-Jōmon. However, most important for us here is that he designates a special phase of Jōmon-lineage Yayoi culture (*jōmon-kei yayoi bunka* 縄文系弥生文化) for the Chūbu and Kantō regions between 600 and 300 BC, the time period examined in detail above.
- MIYAMOTO Kazuo defines the Yayoi period by the development of Itazuke-style pottery and consolidation of the Yayoi package. This concurs with the original definition of Yayoi by ceramic style, though the timing has been pushed back from 300 BC to 600–500 BC.
- SHITARA Hiromi, on the other hand, has defined the period by the type of *subsistence*. He distinguishes grain-growing *farmers* (in Fujio's 'Jōmon-lineage Yayoi culture') from Jōmon *horticulturalists* preceding them on the one hand, and from irrigated-rice *agriculturists* who succeed them (Fujio's 'Yayoi B culture') on the other hand. Shitara emphasizes the multiplicity of cultures, and particularly, different kinds of agriculture

(Shitara 2019).

Despite my previous attempts at proposing an overlap such as Shitara's between the Jōmon and Yayoi *periods*, it seems more appropriate to treat the Yayoi period like Fujio does: as a *temporal container* in which all kinds of cultures were co-existing in different areas. The challenge of this perspective is to divorce ourselves from the idea that Yayoi=irrigated rice agriculture. It is important to note here the shift in terminology from 'wet-rice' to 'irrigated-rice' agriculture. Because rice can be grown in marshlands without irrigation, the formal construction of paddy-fields and irrigation canals becomes an important aspect of defining Fujio's Yayoi A & B cultures as opposed to growing rice in marshes or even on dry land.

We also now have several terms for describing the movements of people, but these are difficult to translate into English. It has long been accepted that prehistoric peoples coming into Japan from the continent are known as *toraijin* 渡来人; once they intermarried with the resident Jōmon people in Kyushu, they are known as Yayoi people (*yayoijin* 弥生人). However, the continental genetic component decreased with distance from Kyushu, as more Jōmon residents (*zairaijin* 在来人) were converted to the Yayoi lifestyle and became therefore, by definition, Yayoi people by their cultural affiliation. And it was possible for *zairaijin* (Jōmon-lineage people) to become farmers without immigrant input. The problem comes when such converted farmers migrate beyond their local areas (*zaichi* 在地), as did the *jōkonmon* pottery users migrating eastwards from the Tōkai region. These new farmers may have been Jōmon-lineage people but were farmers belonging to Fujio's Jōmon-lineage Yayoi culture; when they moved into areas of continuing Jōmon lifestyles, the genetic compositions of these migrant groups (*gairai-kei shūdan* 外来系集団) would have been similar. Thus, we must be careful to distinguish between *immigrants* from the continent, and Yayoi *migrants* whatever their genetic make-up (admixed or Jōmon-lineage).

Fujio's category of "Jōmon-lineage Yayoi Culture" describes perfectly the situation in the central mountains and Kantō Plains regions, where cultivation of a variety of crops, including rice, preceded the instituting of irrigated-rice agriculture in Late Yayoi. This culture, however, was short-lived, lasting from Yayoi I to mid-Yayoi III (600–300 BC). It began with the intrusion of Tōkai pottery (Suijinbira-style) and the adoption of the *jōkonmon* scraped finish to form the local Iwabitsuyama-style pottery. It is assumed that the grains—rice and millets (Table 4)—found associated with pottery in this culture filtered in with the *jōkonmon* manufacturing technique. The pottery mainly occurs in secondary jar burials, which are not just confined to high altitude sites but occur at all altitudes on several different landform types throughout the period (Table 2). Habitation sites of the transitional period are beginning to be discovered, but they prove to be both spatially and temporally ephemeral, suggesting a settlement pattern that may be more mobile than the large villages characteristic of continental-style Yayoi A culture. It is not yet known where and how the farming of the grains took place, or whether swidden techniques were used to clear uplands



for cultivation.

Because of the ephemeral nature of terminal Final Jōmon occupation in the Kantō, it is not possible to respond to Mizoguchi's (2019) hypothesis that cropping was adopted there by Jōmon-lineage peoples because of previous horticultural experience. However, the growing of millet was a spring to autumn activity, and the labour demands would not have interfered with winter hunting, as Mizoguchi surmises.

## 5. Summary

Research has revealed that the transition from Jōmon to Yayoi subsistence patterns was a relatively slow and incremental process that did *not* progress in waves across the landscape but made inroads here and there following previous cultural connections. The first manifestations of the transition in the Tōkai region was a change in ceramic styles, with new shapes being adopted from western Yayoi and a localized surface-finishing technology (*jōkonmon*) developed among surviving Jōmon communities in eastern Japan. The ceramic assemblages of the transitional sites consist of local Final Jōmon-type pottery occurring together with some Ongagawa vessels from Kyushu (or their copies), imported vessels from the Tōkai region, and the new localized *jōkonmon*-finished products. It is assumed that there was a little migration in this phase, but broad networking within the continuing Final Jōmon social structure brought in new ideas and technologies. Results of seed-impression identifications (both on ceramic surfaces and in voids in the ceramic body) indicate that farming accompanied the diffusion of the new formation technology and shape-types; dry-field millets are prominent in this phase, but the presence of some rice suggests it was grown in either dry-fields or natural wetlands. The transitional phases are known archaeologically in the Kantō region by ceramics occurring in secondary jar burials, but short-term occupational remains excavated since the turn of the millennium suggest a transitory settlement system accompanying these jar burials.

This transitional period came to an end with the introduction of full-fledged irrigated-rice technology in late Middle Yayoi (mid-YIII to YIV). Many (but not all) Gunma archaeologists conceive of this introduction in the form of migration of peoples from the west, specifically from Nagano Prefecture, bringing in a specific style of pottery (Kuribayashi-style) which is localized in Gunma as the Tatsumichō-style. This eventually replaces the transitional ceramics (at that point, Jinbo Fujitsuka-style), but some *jōkonmon*-finished pieces and even Late Final Jōmon-lineage pots are found with Tatsumichō-style ceramics; these circumstances suggest a period of co-existence and acculturation. Paddy fields from this time are beginning to be excavated in Gunma, and many sites with Tatsumichō-style pottery are known. However, the pattern of occupation is not regular, with many sites abandoned early and others instituted quite late, as particularly evident from the Yanba Dam



excavations (Table 3).

The routing of the diffusion of irrigated-rice agriculture shown in Figure 2 is also in need of revision. Wet-rice technology was introduced into Gunma from the west via the Chikuma River valley in Nagano Prefecture; in its earliest guise, it did not enter along the historic Tōsandō route from Aichi Prefecture to Mt Asama, nor did it diffuse northwards from the Tokyo Bay region. Kuribayashi-style pottery itself, centred in the Chikuma River valley, is thought to have developed under the influence of Komatsu-style pottery along the Hokuriku coast, which had previously partaken of decorative patterns in Tango (northern Kyoto Prefecture) (Baba 2008). These connections strongly suggest a coastal diffusion of rice agriculture along the Japan Sea coast, with its influences eventually carried into Gunma from the northwest via the Chikuma River.

In Late Yayoi (V), moated villages on the western Yayoi-A pattern became standard, and the area can be considered to belong to Fujio's Yayoi-B cultural sphere. This entailed instigation of the Yayoi-A 'package' but without ritual bronze use. It is assumed, but not yet proven through the study of plant remains or dietary isotopes, that rice was the basic carbohydrate staple, unlike the millet-based subsistence pattern pictured in Figure 1. Thus, however much millet formed an important part of the diet further north in Honshū, the Gunma region is now acknowledged to have participated in the "rice orientation" subsistence pattern of Western Yayoi from the late Middle Yayoi period onwards.

It is unfortunate that so few AMS dates are available for the sequences above, many of which might seem to have contradictory dates based on pottery types at this point. Moreover, the pottery chronologies are still in flux, so that the outline provided here is a work in progress, and some details have been omitted (e.g. discussion of the four Kuribayashi phases and their relationships to the Gunma finds). We look forward to learning of refinements and elaborations of these data in future.

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## References

- Note: GARF=Gunma Archaeological Research Foundation 公益財団法人群馬県埋蔵文化財調査事業団 [www.gunmaibun.org]
- Akazawa, T. 1981. Maritime adaptation of prehistoric hunter-gatherers and their transition to agriculture in Japan. *Senri Ethnological Studies* 9: 213–258 (in English).
- Ando, H. 2014. A critical reconsideration of the criticism on the historical perspective of Japanese history centered on rice cultivation culture. *Bulletin of the National Museum of Japanese History* 185: 405–448 (in Japanese with English title and summary).
- Aramaki, M., W. Tōru, M. Shigeo, T. Kazuo, & I. Yoshio. 1988. On the structure of secondary burial at the Oki II site, Gunma Prefecture, central Japan, from the study of the human bones. *Bulletin of the Gunma Prefectural Museum of History* 9: 59–98 (in Japanese).
- Baba, S. 2008. Reconsidering the chronology of pottery styles of Mid-Yayoi, and theories of distribution: putting into perspective the possibility of Yayoi Period trading. *Bulletin of the National Museum of Japanese History* 145: 101–174 (in Japanese with English title and abstract).
- Baba, S. 2018. Tochihara Rock Shelter Festival. *Handout distributed at the Festival*, October 2018, Nagano.
- Baba, S. & E. Endō. 2017. Archaeobotanical investigation of domesticated cereals on Kuribayashi-type pottery in the middle Yayoi period of the central highland Japan using the Replica-SEM Method. *Natural Resource Environment and Humans* 7: 1–22 (in Japanese with English title and summary).
- Barnes, G.L. 2010. Landscape and subsistence in Japanese history, in P. Martini & W. Chesworth (ed.) *Landscapes and societies: selected cases*: 321–340. Dordrecht: Springer.
- Barnes, G.L. 2015. *Archaeology of East Asia: the rise of civilization in China, Korea and Japan*. Oxford: Oxbow.
- Barnes, G.L. 2019. Tephrogenic soils of Japan in comparative context, in G.L. Barnes & T. Soda (ed.) *TephroArchaeology in the North Pacific*: 202–233 Oxford: Archaeopress.
- Barnes, G.L., E. de Boer, M. Yang, & A. Kawagoe. 2019. The spread of agriculture through the Japanese Islands: people, settlement, and language, Presentation at the interdisciplinary conference on the Prehistory of Transeurasian millets and beans, languages and genes Max Planck Institute for the Science of Human History, Jena, 8–11 January 2019.
- Barnes, G.L. & T. Soda. 2019. *TephroArchaeology in the North Pacific*. Oxford: Archaeopress.
- Daikuhara, Y. 1987. *Shimebiki-hara site*. Annaka City: Annaka-shi Board of Education (in Japanese).
- Daikuhara, Y. 1988. *Shimebiki-hara II site: Sumiregaoka Park construction excavation report*. Annaka City: Annaka-shi Board of Education (in Japanese).

## THE JŌMON–YAYOI TRANSITION IN EASTERN JAPAN

- Fujio, S. 1991. Wet-rice agriculture and *tottaimon* pottery, in Yokoyama Kōichi Retirement Volume Committee (ed.) *The establishment of early Yayoi culture in Japan*: 187–270 (in Japanese).
- Fujio, S. 2009. Interaction between the Jomon farmer and the Yayoi farmer in the beginning of the Yayoi Period along the Old Kawachi Lake. *Bulletin of the National Museum of Japanese History* 152: 373–400 (in Japanese with English title and abstract).
- Fujio, S. 2013. The frame of the Yayoi culture: is wet rice cultivation with irrigation system an indicator of the Yayoi culture? *Bulletin of the National Museum of Japanese History* 178: 85ff (in Japanese with English title and abstract).
- Fujio, S. 2014. When did the wet rice cultivation with the irrigation system begin in the Western Japan. *Bulletin of the National Museum of Japanese History* 183: 113–143 (in Japanese with English title and abstract).
- Fujio, S. 2017. How should we view the Yayoi culture of Tōhoku? Presentation at the symposium Didn't Yayoi Culture Exist in Sendai Plain?: Lecture and Discussion on Mr. Shinichiro Fujio's New Theory, 19–20 November 2017, Sendai (in Japanese).
- GARF 2018. *Main sites of Yanba Dam excavations*. Nagahara-chō: Nagahara Township Board of Education.
- GARF [Gunma Archaeological Research Foundation] n.d. Fears and prayers: Gunma cultural properties—the Yayoi period (in Japanese). <http://www.gunmaibun.org/osoretoinori/yayoi/yayoi03.html>.
- Gunma Maibun 2019. Permanent exhibit of Yayoi pottery type successions in Gunma, viewed on 16 May'19, as guided and explained by Ooki Shinichirou.
- Habu, J. 2004. *Ancient Jomon of Japan*. Cambridge University Press.
- Hamada, S. 2019. Thoughts on a wet-rice cultivation dependent view of the Yayoi period. *Nihon Kōkōgaku* 48: 71–82 (in Japanese).
- Horaguchi, M. 2019. TephroArchaeology in the Gunma region: an overview, in G.L. Barnes & T. Soda (ed.) *TephroArchaeology in the North Pacific*: 158–166. Oxford: Archaeopress.
- Hosoda, K. 2019. Middle Yayoi burials and pottery in the Menuuma lowlands, Saitama Prefecture. *Komazawa Kōko* 44: 27–38 (in Japanese).
- Hudson, M.J. 1992. Rice, bronzes and chieftains: an archaeology of Yayoi ritual. *Japanese Journal of Religious Studies* 19(2/3): 139–189.
- Hu, Y., S.H. Ambrose, & C. Wang. 2006. Stable isotopic analysis of human bones from Jiahu site, Henan, China: implications for the transition to agriculture. *Journal of Archaeological Science* 33(9): 1319–1330.
- Iijima, Y., K. Toyama, & S. Miyazaki. 1994. The significance of shell ornaments from Yatsuhagi Cave site, Gunma Prefecture. *Bulletin of the Gunma Prefectural Museum of History* 15: 11–30 (in Japanese).
- Kaifu, Y. 1992. Human skeletal remains of the Yayoi period from the Iwatsubo Cave site in Gunma Prefecture, Kanto District. *Jinruigaku Zasshi* 100(4): 449–483 (in Japanese with English title and summary).

- Kanagawa Kyōi 2012. *Yayoi-period Kanagawa: a settlement of migrants and social change*. Yokohama: Kanagawa Board of Education (in Japanese).
- Kaner, S. & K. Yano. 2015. Early agriculture in Japan, in G. Barker & C. Goucher (ed.) *The Cambridge World History, Volume 2: A World with Agriculture, 12,000 BCE–500 CE*: 353–386. Cambridge: Cambridge University Press.
- Kobayashi, A. 2004. Settlement system and house structures in the beginning agriculture phase—focussing on the central mountains and Kantō. *Teikyo Daigaku Yamanashi Bunkazai Kenkyūsho Kenkyū Hōkoku* 12: 243–259 (in Japanese).
- Kobayashi, K. 2014. Study of dating on the prehistoric archaeology of Japan. Presentation at the Workshop on Radiocarbon Dating in Japanese Archaeology 8–10 April 2014, Sainsbury Institute for the Study of Japanese Arts and Cultures (SISJAC), Norwich.
- Kobayashi, K. 2017. *Absolute dates for the Jomon period: ceramic chronology and radiocarbon dates*. Tokyo: Dōseisha (in Japanese).
- Kuwahata, M. 2019. Restoration of agricultural assets after volcanic disasters in southwest Japan, in G.L. Barnes & T. Soda (ed.) *TephroArchaeology in the North Pacific*: 139–201. Oxford: Archaeopress.
- Maebashi/Takasaki Kyōi. 2013. *Maebashi and Takasaki Yayoi period: pioneers of 2000 years ago*. Maebashi & Takasaki Cities: Boards of Education.
- Matsumura, H. 2001. Differentials of Yayoi immigration to Japan as derived from dental metrics. *Homo* 52(2): 135–156 (in English with Japanese summary).
- Miyamoto, K. 2018. Re-examining the absolute date of Yayoi-period beginnings. *Kōkogaku Zasshi* 100(2): 1–27 (in Japanese).
- Miyamoto, K. 2019. The spread of rice agriculture during the Yayoi Period: from the Shandong Peninsula to the Japanese Archipelago via the Korean Peninsula. *Japanese Journal of Archaeology* 6(2): 109–124.
- Mizoguchi, K. 2013. *The archaeology of Japan: from the earliest rice farming villages to the rise of the state*. Cambridge: Cambridge University Press.
- Mizoguchi, K. 2019. Re-thinking the origin of agriculture through the ‘beginnings’ in the Japanese archipelago. *Japanese Journal of Archaeology* 6(2): 95–109.
- Nagai, H. 2007. Research on pottery styles of *jōkonmon* lineage. *Aichi Maizō Bunkazai Kenkyū Kiyō* 8: 23–32 (in Japanese).
- Nagano-shi Kyōi n.d. Large discovery of cultivated millet [Setaria]. *Saishin Chōsa Seika Kara* 1: 2.
- Nagano-shi Kyōi 2018. *Nagano site cluster: Agata-machi (2)*. Nagano: Nagano City Board of Education.
- Nakatsuka, T. 2015. New possibilities in archaeological research enabled by oxygen isotope dendrochronology. *Kokogaku Kenkyū* 62(2): 17–30.
- Noto, T. & A. Kojima. 1989. Terrain chosen for Early Yayoi-period settlements in the Kantō region. *Bulletin of Public Corporation for Archaeological Operations of Gunma* 6: 19–44 (in Japanese).
- Noto, T. & A. Kojima. 2005. On the location of Early Yayoi period settlements in the

## THE JŌMON–YAYOI TRANSITION IN EASTERN JAPAN

- Tohoku district. *Bulletin of Gunma Archaeological Research Foundation* 23: 11–33 (in Japanese).
- Noto, T. & G.L. Barnes. 2019. Farming tephrogenic soils in Gunma: before and after volcanic eruptions, in G.L. Barnes & T. Soda (ed.) *TephroArchaeology in the North Pacific*: 234–260 Oxford: Archaeopress.
- Odawara-shi Kyōi 2017. *Nakazato site: the largest and earliest Yayoi site in eastern Japan*. Odawara City: Board of Education (in Japanese).
- Ohnuki-Tierney, E. 1993. *Rice as Self: Japanese identities through time*. Princeton University Press.
- Ojisan 2017. Advent of the Yayoi period: settlements and burials at the time of agricultural beginnings. *Ojisan no oboegaki* [<https://plaza.rakuten.co.jp/narcisse/diary/201710150000/>] (in Japanese).
- Ooki, S. 2019. Late Yayoi period's sites in the Agatsuma River basin of Gunma Prefecture. *Bulletin of Gunma Archaeological Research Foundation* 37: 33–52 (in Japanese).
- Sakaguchi, H. 2010. Nakaimachi, Takasaki: trends of the surrounding settlement of Itchōme site—relations between paddy fields and surrounding settlement,” in GARF (ed.) *Nakaimachi Itchōme Iseki* 3: 17–22. Shibukawa: Gunma-ken Maizōbunkazai Chōsadan.
- Sakura-shi [Sakura City Iwana Tenjinmae Site Symposium Organizing Committee] 2016. Invitation to join the symposium. [<https://yatikurike.exblog.jp/25729901/>] (in Japanese).
- Satō, Y. 2002. The Jōmon/Yayoi transition in northern Honshu as seen from volumetric changes in cooking vessels. *Nihon Kōkōgaku* 13: 1–18 (in Japanese with English title and summary).
- Shitara, H. 1988. Problems on the study of secondary burials. *Kōkōgaku Zasshi* 74(2): 108–109 (in Japanese).
- Shitara, H. 1991. The Yayoi culture of the Kantō, in Museum of Yayoi Culture (ed.) *Yayoi culture: searching for the origins of Japanese culture*: 196–202. Osaka: Yayoi Bunka Hakubutsukan (in Japanese).
- Shitara, H. 2006. Process of the formation of farming settlements in the Yayoi period in the Kanto region. *Bulletin of the National Museum of Japanese History* 133: 109–153 (in Japanese with English title and summary).
- Shitara, H. 2014. Yayoi culture as a complex of multiple farming cultures. *Bulletin of the National Museum of Japanese History* 185: 449–469 (in Japanese with English title and summary).
- Shitara, H. 2019. *The archaeology of agricultural complexes I: the beginning of agriculture*. Tokyo: Yuzankaku (in Japanese).
- Shitara, Hiromi & Takashe, [sic] Katsunori 2014. The beginning of the cereal cultivation in the south-west Kanto District by the analysis of replica. *Bulletin of the National Museum of Japanese History* 185: 511–530 (in Japanese with English title and summary).



- Sugiyama, H. 2019. Investigations into the Kofun period disasters caused by Mt Haruna eruptions, in G.L. Barnes & T. Soda (ed.) *TephroArchaeology in the North Pacific*: 168–182. Oxford: Archaeopress.
- Takasaki-shi Kyōi n.d. Hidaka site. *Takasaki-shi no Bunkazai Kokushitei Tōroku* [<http://www.city.takasaki.gunma.jp/docs/2013121600316/>] (in Japanese).
- Toyama, K., S. Miyazaki, & Y. Iijima. 1989. The significance of perforated human teeth and bones in secondary burials. *Bulletin of the Gunma Prefectural Museum of History* 10: 1–30 (in Japanese).
- von Verschuer, C. 2016. *Rice, agriculture, and the food supply in premodern Japan*. London: Routledge.
- Watanabe, S. 1986. Regional characteristics of the early Middle Yayoi in the Kantō region. *Chiba-ken Bunkazai Sentaa Kenkyū Kiyō* 10: 113–134 (in Japanese with English title).
- Yokoyama, K. 1978. Fundamental experimentation relating to the tool producing hakeme finish. *Kyushu Bunkashi Kenkyūsho Kiyō* 23: 1–24 (in Japanese).

## Site Appendix: Yayoi sites from terminal Early Yayoi (I) to mid-Middle Yayoi (mid-III) in Gunma

Those sites appearing on the Yayoi Secondary Burial signboard in the Gunma Prefectural Museum (Gunma-ken n.d.) are keyed by number (#) to the signboard (text not included here). Details are incomplete. 1½=first half of..., 2½=second half of...; tEY=terminal Early Yayoi, bMY=beginning Middle Yayoi; EY(I), MY(II, III, IV); ABS=artefact-bearing stratum (包含層 *hōgansō*)=cultural layer.

- ARIGASAYAMA CAVE 有笠山洞窟 (#2); 吾妻郡中之条町上沢渡字牧場 Agatsuma-gun, Nakanojō, Kamisawatari, Makiba, 884m msl (GARF 2009a; Agatsuma-cho 2004: 11; GARF 1999: 15)

The whole of Mt Arigasa is known as a Yayoi burial ground mostly for Middle Yayoi remains. Two caves at Arigasayama yielded Yayoi pottery, successively from the first half of Middle Yayoi (Cave 2, discovered in 1953) then second half of Middle Yayoi (Cave 1, excavated in 1996). The remains from Cave 1 are preserved at Gunma University, while those from Cave 2 are split between Nakanojō Township Kyōdō Shiryōkan and the Prefectural Museum.

Cave 2 mouth was 1.0m high, .8m wide, and the cave was 1.8m deep and 1.5m high. The remains, dating to the 1½ of Yayoi, comprised a burial with two personal ornaments; the shell arc-pendant suggests long-distance trade, but the pumice bead was probably local. The contents strongly resemble Yatsuhagi. In 1990, further finds were made in Cave 2: pot sherds, and pendants made of perforated human fingerbones.

The mouth of Cave 1, a rock shelter, was 20m across, the interior measured 12m deep and 15m high; it was large enough to have three areas with occupation remains including burned earth, stone tools (polished axe), a hearth, and burned deer and boar bones. These later finds, dating to the 2½ of Middle Yayoi (Tatsumichō) attest to the continuation of hunting practices from the Early Yayoi, and we may presume this cave may have functioned as a temporary hunting campsite.

- ATSUBO 安坪遺跡;高崎市吉井町長根 Takasaki-shi, Yoshii-chō, Nagane, 127m msl (Maebashi/Takasaki Kyōi 2013)

Cluster of pits dating to mid-MY.

- HIRAI 平井遺跡; 桐生市平井 Kiryū-shi, Hirai, 180m msl (GARF 1989: 324; GARF n.d.)

Two Middle Yayoi pots said to have been washed out of a burial pit 65×40×45 cm deep at the foot of a hill range during heavy rain. One was a cylindrical vessel with terminal Jomon decoration, the other a pot of Middle Yayoi Nozawa I-style, proving that there was

overlap between continuing Jomon and Yayoi.

- ITOI MIYAMAE 糸井宮前; 利根郡昭和村糸井大貫原 Toné-gun, Shōwa-mura, Itoi, Ōnuki-hara (Noto & Kojima 1989)  
Final Jōmon site Miya-no-mae; ABS with Ongagawa I-new sherds.

- IWABITSUYAMA 岩櫃山遺跡群 (#1); 吾妻郡東吾妻町原町 Agatsuma-gun, Higashi Agatsuma-cho, Haramachi, 775 m msl (Sugihara 1967; Watanabe 1986; Iijima *et al.* 1986: 55; Agatsuma-cho 2004: 2; Anon. 2005: 4; GARF n.d.)

Designated a Township Important Cultural Property in 2004, Iwabitsuyama site is a rugged collection of andesite outcrops. One rock shelter within, called Takanosu 鷹ノ巣 (Eagles' nest), was excavated by SUGIHARA Sōsuke in 1939. The shelter floor was triangular in shape, covering ca. 100 m<sup>2</sup>, and sloped 20° back to front. It yielded 21 pots, 19 of which were clustered into three groupings (A, B, C) toward the front of the shelter;



*Mt Iwabitsu in Gunma Prefecture (courtesy of Soda Tsutomu)*

the pots contained human bones. All these materials are preserved at the Meiji University Museum. These remains are dated over the terminal Early—beginning Middle Yayoi divide, and the style of pottery from Takanosu (Iwabitsuyama-style) is representative of the beginning of Middle Yayoi in the north Kantō region (GARF n.d.: 2).

Watanabe notes that one jar from Group B is comparable to Maruko-style pottery from Tōkai (1986: 121); while Shitara (2006: table 1) aligns the materials with Suijinbira-style pottery from Tōkai and puts it later than Dōyama in Kanagawa. In the Mt Iwabitsu sites, the pottery consists of a majority of local pottery (Iwabitsuyama-style) decorated with linked-triangle (*sankaku renkeimon*) design and *jōkonmon* finish as well as some zoned cord-marked wares of Final Jōmon style.

A second rock shelter on Iwabitsuyama called Makuiwa 幕岩, situated just below Takanosu, yielded the same types of materials: bone fragments and Iwabitsuyama-style pottery, in addition to Final Jōmon Chiami-type and Early Jōmon Moroiso-type pottery.

- IWATSUBO CAVE 岩津保洞窟 aka 岩津保観音堂 Iwatsubo Kan'ondō; 多野郡神流町青梨 Tano-gun, Kanna, Aonashi, 394 m msl [located at beginning of bridge just before tunnel on Rt 426 (Jukkoku-tōge Kaido)] (Iijima *et al.* 1986: 55; Kaifu 1992; Matsumura 2001; GARF 1989: 39; 2009b)

Iwatsubo Cave, eroded into a quartzite cliff, measures 8m wide, 16m deep, and 7m high; it was investigated between 1980 and 1982. The cave stratigraphy built up from Initial through Final Jōmon and Middle Yayoi. The uppermost layer, dating to the first half of Middle Yayoi, contained four pits yielding six flexed burials in the Jōmon style, ranging from infants to adults. Three individuals (2 females, 1 infant) were buried together in one pit; these had 20 shell bracelets and 3 large stones placed on them, with antlers and fabric-impressed-base pottery set on top of the stones and then all burned.

The excavators note that influences were apparent from the north (Nozawa I-style pottery), from the west (tooth extraction in the Tōkai region), and the south (shell bracelets)—indicating widespread contacts and interaction.

Two of the adults were females whose bone morphology indicates they are of Jōmon lineage though the individuals were slightly taller and more robust long bones than the Jōmon sample (Kaifu 1992). This determination was confirmed by dental morphology (Matsumura 2001).

- JINBO UEMATSU 神保植松遺跡 (#6) aka Inariyama site 稲荷山遺跡; 高崎市吉井町神保 Takasaki-shi, Yoshii, 170 m msl (GARF 1989: 193, 1997; Shitara 2006; Iseki Walker 2007-18a; Maebashi/Takasaki Kyōi 2013)

Located on a riverine terrace and excavated during expressway construction between 1987 and 1989, this site has yielded remains from the Jōmon through medieval periods.

Yayoi remains included 3 pit-buildings, 2 at ca. 4.2m square, ranging from 4 to 30 cm deep. They were equipped with floor hearths. The remains dated to Middle Yayoi II~early III. [Jinbo Fujitsuka site reported under Jinbo Uematsu entry in GARF 1989]

- JINBO FUJITSUKA 神保富士塚遺跡; 高崎市吉井町神保字富士塚 577 Takasaki-shi, Yoshii, Jinbo, Fujizuka 577, 170 m msl (Ono 1993; Ishikawa 2003; Shitara 2006; Maebashi/Takasaki Kyōi 2013)

Adjoining Jinbo Uematsu site, 77 pits were found dating to mid-Middle Yayoi (phase III); the pits seemed to be arranged in a ring. Some of them contained bowls, cooking pots, and jars together with many other sherds and stone tools; these are not thought to be burials. At least pits #705 and 706 are thought to be secondary burials.

- KAMIGO 上郷遺跡; 藤岡市緑埜郡上郷 Fujioka-shi, Midono-gun, Kamigo (Shitara 2006: fig. 9#1)

MYII-old (early Oki-type) sherds from tip of hill overlooking upland stream.

- KAMI-NO-KUBO/KAMIKUBO 上(ノ)久保 (#5) (Yamazaki 1959; Watanabe 1986; GARF 1989: 91; Iseki Walker 2007-18b; Maebashi/Takasaki Kyōi 2013). 高崎市倉渚町権田 Takasaki-shi, Kurabuchi-chō, Gonda, 590 m msl

Situated on a tongue of riverine terrace, this site was excavated in 1954. 3 jars and 3 cooking pots were found standing upright, dating to 2½ Early Yayoi. Two of the jars bore *jōkonmon* patterns and are considered to be Sujinbiru-style jars from the Tōkai region. The third jar was Ongagawa-style. The cooking pots also bore either/or both *jōkonmon* with local linked-triangle-designs. These are one phase earlier than Iwabitsuyama and represent the earliest phase of influence from the west. Also present was a flaked hoe and a flat stone serving as a jar lid, while another vessel was covered with a large ceramic sherd; these are considered secondary burials.

#### **KANAMARU site: see Ōgo-Kanamaru**

- KANNON-MAE 観音前遺跡 (#11); 富岡市七日市 Tomioka-shi, Nanoka'ichi, 173 m msl (GARF n.d.)

A pit 3.2×3.4m containing Middle Yayoi zoned cord-marked pottery was discovered on a riverine terrace. There was no evidence of a hearth or any other features indicating it was a pit-house, so it is interpreted as a secondary burial or a ritual site.

- KITSUNEZAKI 狐崎遺跡; 甘楽郡甘楽町大字天引字狐崎 Kanra-gun, Kanra-machi, Amabiki Kitsunezaki (Shitara & Takashe 2014; Iseki Walker 2007-18d; GARF 1989: 10)



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Earliest Yayoi ceramics in Gunma, equivalent to Suijinbira-style (Shitara & Takashe 2014: 516). Also, Yayoi period: 34 pit-houses, 13 pits, 1 secondary jar burial, 2 round moated precincts, and a weir; Early Yayoi pottery from North Kyushu, Late Yayoi 1 bronze bracelet, 5 iron arrowpoints, lidded pot, a wooden fish-spear, and much driftwood.

- KIYOMIZU 清水遺跡; 吾妻郡中之条町山田 Agatsuma-gun, Nakanjō-chō, Yamada (Noto & Kojima 1989)

Final Jōmon site ABS with Ongagawa sherds.

- KUROKAWA KOZUKA 黒川小塚; 富岡市立黒岩小学校 Tomioka City Kuroiwa Elementary School (Tomioka City 2018)

A moated settlement dating from late Middle Yayoi through Early Kofun. Carbonized rice husks were dated by Hirosaki University to 175±20 BC.

- MAEHATA 前畑遺跡; 吾妻郡東吾妻町岩下 Agatsuma-gun, Agatsuma, Iwashita, 428 m msl (Agatsuma-chō 2004: 8; GARF 1989: 351)

Pre-construction excavations, for a community center in 1988 on a flat riverine terrace in the deep mountains, uncovered Middle Yayoi to Heian period remains. The Yayoi finds consisted of 9 pits containing Takanosu-type (Iwabitsuyama-style) pots; these are interpreted as secondary burials.

### MAKUIWA rock shelter: see Iwabitsuyama

- MINAMI ŌTSUKA 南大塚遺跡 (#8); 渋川市 Shibukawa-shi, ca. 440 m msl (Noto & Kojima 1989; Shitara & Takashe 2014; Watanabe 1986; GARF n.d., 1989: 365)

Jōmon and Yayoi pottery occur together at this site. Discovered during road-widening in 1979 along the Agatsuma River, a cluster of 3 rectangular burial pits. #1 pit contained 4 jars; #2 pit contained 2 jars and 2 cooking pots, a pedestaled bowl and a large stone; #3 pit was destroyed by the construction but yielded one jar. Included among the *jōkonmon* pottery were some sherds of Ongagawa pottery. The pits contained bones and are considered secondary burials employing reused utilitarian vessels; interment of several jars interpreted as kinship groupings. They date from terminal Early Yayoi through Middle Yayoi. Shitara and Takashe (2014: 516) say earliest Yayoi pottery in Gunma is equivalent to Suijinbira. A perfect Final Jōmon-style pedestaled bowl was used in a terminal Early Yayoi secondary burial, possibly to hold food for the dead. Other burial jars date to Middle Yayoi.

- MIYAGAITO 宮谷戸遺蹟; 高崎市下室田 Takasaki-shi, Shimo-murata (Maebashi/

Takasaki Kyōi 2013)

Jar and cooking pot dating to 2½ Middle Yayoi.

- MIZUNUMA NAKAGŌ 水沼中郷; 群馬郡倉淵村 (Noto & Kojima 1989)  
ABS containing Suijinbira pottery.
- MYŌJIN 明神遺蹟; 前橋市元総社 Maebashi-shi, Moto-Sōja, 115 m msl (Maebashi/Takasaki Kyōi 2013)  
1½ Middle Yayoi pottery from ABS at base of river channel.
- NAKAGAWA 中川遺跡; 高崎市中里見町 Takasaki-shi, Nakasatomi-chō, ca. 154 m msl (Maebashi/Takasaki Kyōi 2013)  
Walking footprints indicating paddy field in lowlands next to Karasu River, EY–1½ MY. Much pottery influenced by Kōri and Chiami styles.
- NAKANNOYA-HARA 中野谷原遺跡; 安中市中野谷原 Annaka-shi, Nakanoyahara, 265-6m msl (Inoue *et al.* 2004; Shitara 2006; Shitara & Takashe 2014)  
Remains from the first half of Middle Yayoi (II old~1½ III) consisted of 15 pit-houses, 10 pits, and stone tools that are reported to have Poaceae (Graminae) gloss (Shitara & Takashe 2014: 515). Most of the pit houses were round or oval in shape, ranging from 4 to 7m across. They were all very shallow, mostly 10 cm deep. Most hearths were on the floor, some with stone surrounds. There were also Mid-Middle Yayoi secondary burials.
- NAKAZENJI 中善地遺跡; 高崎市箕郷町善地 Takasaki City, Misato, Zenji, 300 m msl (GARF n.d., 1989: 268)  
On the south-eastern flank of Mt Haruna, ceramics were accidentally found that are thought to have been burial jars. Some of the pots were similar to Takanosu (Iwabitsuyama-style), but others belonged to the Suwada-style distributed in eastern Kantō, attesting to relations between these areas.
- ŌGO-KANAMARU 大胡金丸遺跡 (#13); 前橋市大胡町 Maebashi-shi, Ōgo, 420 m msl (Maebashi/Takasaki Kyōi 2013; GARF n.d.)  
At the Kanamaru site, 1½ Middle Yayoi burial pots similar in style to those at Takanosu were discovered during agricultural activities on the southern flank of Mt Akagi. Thought to be secondary jar burials; the site yielded 4 jars, 3 cooking pots, 1 shallow bowl, and 1 pedestaled vessel.
- ŌKAMI 大上遺跡; 安中市上間仁田 Annaka-shi, Kamimanita, 248 m msl (Inoue *et al.*

2003; Shitara 2006)

Four buildings dating to Middle Yayoi, three specifically to phase II. Three pit-house shapes are rounded-corner rectangular or square, with house-pits between 1 and 15 cm deep; two could be measured at 3.2×5m and (2.6)×3 m. A fourth surface building size was unclear. All had hearths on the floor, in one pit-building with a rock surround.

- OKI II 沖II遺跡 (#12); 藤岡市立石沖 Fujioka-shi, Tatsuishi, Aza-Oki, 69 m msl (Shitara 1985; Aramaki *et al.* 1988; Watanabe 1986; Noto & Kojima 1989; GARF n.d., 1989: 59)

This is an unusual site as it is located on a natural levee of the Karasu River at relatively low altitude near the Final Jōmon site of Yachi. Excavated in 1983, Oki II site yielded an ABS with Suijinbira pottery, and tEY~bMY pottery in 27 pits, mostly with one vessel per pit. One pit had not pot but human and animal bones on a stone floor. The pottery bore *jōkonmon*; some pots and jars had I-shaped decoration, some with *sankaku renkeimon*. Bones from these have burials have been extensively studied by Aramaki and colleagues. Lithics included flaked hoes, arrowheads, querns, and much flaking debris. 50% of pottery in pits were jars, 20% in ABS; also in ABS cooking pots 50%, bowls 25%. Large jars with *jōkonmon* made locally in imitation of Tōkai, but sherds of imported Maruko and Suijinbira. Watanabe reports pottery of Uwabitsuyama-style of the terminal Early Yayoi. Shitara aligns Oki with Suijinbira-style Tōkai pottery (Yayoi I new).

- OSAKA 尾坂 (#4); 長野原町大字長野原字尾坂 Gunma-ken, Naganohara, 738 m msl (GARF 2015, 2018)

Yayoi secondary burial(s) discovered in construction for the Yatsuba Dam. Pottery dating the terminal Final Jōmon (Kōri-style) and 1½MY periods was recovered.

- OSHIDE 押手遺跡 (#7); 渋川市中郷 Shibukawa-shi, Nakagō [旧: 北群馬郡子持村北牧] (Noto & Kojima 1989; GARF 1989: 61; Ooki 2001)

Yayoi secondary burial discovered on the southern flank of Mt Komochi dug into the middle of a Final Jōmon site; the site has been termed a ‘banked cemetery,’ but this attribution is unclear. Other Yayoi pits were filled with fragments of burned bone. Pottery included *jōkonmon*, Suijinbira-old, and Ongagawa (photos in Ooki 2001). One Ongagawa (EYmid-I) pot has a rice husk impression.

- SHIMEBIKI-HARA I 注連引原遺跡; 安中市鷺宮大林西 Annaka-shi, Saginomiya, Ōbayashi-nishi 238 m msl (Daikuhara *et al.* 1987; Shitara 2006; Maebashi/Takasaki Kyōi 2013)

A Final Jōmon site that has tEY~bMY pottery, excavated in 1985–6. A rectangular, shallow house-pit, 5~6×6~7 m; it had a hearth outlined with rocks on the house floor.

Assigned to Early Yayoi (I old). Most artefacts in ABS. Another house (?) was 3.5 m/side with similar features.

- SHIMEBIKI-HARA II 注連引原II遺跡 (#10); 安中市鷺宮Annaka-shi, Saginomiya, ca. 238 m msl (Daikuhara *et al.* 1987, 1988; GARF 1989: 159-60; Inoue *et al.* 2003; Shitara 2006; Ojisan 2017)

Three building traces were recovered here at Loc. 1: one surface and two squarish house pits, one 3.5 m sq. and 20 cm deep, the other 6 cm deep measuring 3.2 m sq. all dating to Yayoi I (new). Some remains dated to Yayoi II (old). Of two houses at Loc. 2, one had only burned earth attesting a hearth.

Behind the pit-buildings positioned in an arc were found 30 pits. Three were fairly large ovals with relatively more pottery and stone tools, while the others were irregular in shape with few artefacts.

Excavations later recovered 10 pillared buildings without hearths, all dating to the second half of Middle Yayoi, as documented in the Annaka City Furusato Gakushūkan exhibit in 2017.

- SHINMEISAN 神明山遺跡; 桐生市広沢町三丁目 Kiryū-shi, Hirosawa-chō 3, 143 m msl (GARF n.d.; Kiryū-shi n.d.)

This site was occupied in the Jōmon–Heian periods. A small zoned cord-marked pot dating to Middle Yayoi was excavated here. It echoes influences from Suwada-style pottery in eastern Kantō.

- SHIROISHI ŌMIDŌ 白石大御堂遺跡; 藤岡市白石 Fujioka-shi, Shiroishi (Shitara 2006: fig. 9)

Site is located on alluvial high ground (levee?); yielded Ongagawa sherd(s) dating to the Oki pottery phase of tEY (YI-old) and Final Jōmon pottery.

### **TAKANOSU rock shelter: see Iwabitsuyama**

- TANAKADA 田中田遺跡; 前橋市富士見町横室 Maebashi-shi, Fujimi-chō, Yokomuro, 164 m msl (GARF 1989: 228; Maebashi/Takasaki Kyōi 2013)

1½ Middle Yayoi secondary burial site

- TATSU-IWA 立岩遺跡; 利根郡川場村 Toné-gun, Kawaba-mura, 542 m msl (GARF n.d.: 3; Ooki 2019)

At the northwest end of Kantō Plain, the site has Middle Yayoi Yamasōka-type 山草荷 pottery distributed from Hokuriku across southern Tōhoku; brought into Gunma from

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the north. Aizu Basin to the north can be reached via mountain passes, and Ooki (2019) suggests a passage westwards from the Tatsu-iwa site directly to the Agatsuma River via the Nakuta River.

- TATSUMI-CHŌ 竜見町遺跡; 高崎市 竜見町, 92 m msl (Baba 2008)  
The type site for Tatsumi-chō style pottery of Yayoi IV, divided into 4 stages—the first being the pre-Tatsumi phase from Yatsuhagi Cave site.
- TERASAWA 寺沢遺跡; 高崎市倉渚町水沼 Takasaki-shi, Kurabuchi-chō, Mizunuma (Takasaki/Maebashi Kyōi 2013)  
A large jar thought to be an infant burial dating to tEY~bMY.
- UEHARA 上原 1, 3; 吾妻郡長野原町大字林 Agatsuma-gun, Naganohara-machi 642 m msl (Naganohara-chō 2013-14)  
Three pits with Yayoi pottery, one dating to tEY; secondary jar burials (?) discovered in construction.
- UWAHITOMI 上人見遺跡 (#9); 安中市松井田町人見向原 Annaka-shi, Matsuida, Hitomi Mukuihara, 715 m msl (Noto & Kojima 1989; GARF 1989: 47; Iseki Walker 2007-2018c; Ojisan 2017)  
Two Yayoi secondary burials; 3 jars, 2 pots. No bones but reaper and chipped stone tool. All Iwabitsuyama type bearing *jōkonmon* but Noto & Kojima also specify Suijinbira; plus local Jōmon pots dating to the end of Early Yayoi. Located near the Final Jōmon Tenbikihara site.
- YATSUHAGI 八束脛洞窟 (#3); 水上町後閑字穴切, 石尊山 Minakami, Gokan, Anagiri, 650 m msl (GARF 1989: 389; Tsukiyono-chō Kyōi n.d.; Agatsuma-chō 2004: 10; Miyazaki *et al.* 1985; Iijima *et al.* 1986, 1987, 1994; Toyama *et al.* 1986; Gunma-ken Kyōi 1994).  
This site was investigated archaeologically in 1993. In addition to the presence of Early Jōmon pottery, pottery from the first half of Middle Yayoi was recovered: Suwada, Kuribayashi I, and Nozawa II. The site consists of four caves (A,B,C,D from bottom to top) carved into welded tuff, yielding the remains of at least 34 people. Cave A is smallest (2 m wide×1.5 m high, 2.5 m deep); it contained no artefacts. Cave B (15 m wide×3.5 m high, 6.2 m deep) had many human bones and one polished axe. Cave C (9.3 m wide×3.3 m high, 5.5 m deep) had few artefacts (flaked arrowhead) but human bones were found in a pit plastered over. Cave D (12.6 m wide×3.7 m high, 5.2 m deep; this was the most productive, containing burned bones from infants to elders. Some adults had teeth ritually removed (a western Japan practice). Iijima *et al.* (1986: 48) note that burned bones are a



regional feature (known in Nagano, Niigata, Fukushima, Gunma, and Saitama at that time) that might indicate a separate practice of cremation in addition to or in place of secondary jar burial.

The associated ornaments were of greater variety and manufacture than those of Arigasayama. Perforated human fingerbones (10) and teeth (8) were among 8 jasper flakes (that had been heated), 19 shell bracelets, 9 shell beads, 3 jasper cylindrical beads, 2 boar tusk beads, and flaked arrowhead(s); the jasper and shells in particular suggest long-distance exchange, as the sources of various ornamental stones are mostly found on along the Japan Sea coast and the shell types are found south of the Izu Peninsula.

Many of the human bones from Cave B were preserved in a shrine built by the local ruler of Numata Castle but were later lost in a fire.

## Sources

### In Japanese unless otherwise stated

- Agatsuma-cho 2004. *Ancestral mountain Iwabitsu—Takanosu site and Yayoi burials exhibition catalog*. Gunma: Agatsuma Township Board of Education.
- Anon. 2005. Yayoi secondary burial Iwbitsuyama site—designation of Important Cultural Property in Agatsuma-cho, Gunma. *Meiji University, Museum Eyes* 39: 4.
- Aramaki, Minoru; Wakasa, Tōru; Miyazaki, Shigeo; Toyama, Kazuo & Iijima, Yoshio 1988. On the structure of secondary burial at the Oki II site, Gunma Prefecture, Central Japan, from the study of the human bones.” *Bulletin of the Gunma Prefectural Museum of History* 9: 59–98.
- Baba, Shin’ichiro 2008. Reconsidering the chronology of pottery styles of Mid-Yayoi, and theories of distribution: putting into perspective the possibility of Yayoi Period trading. *Bulletin of the National Museum of Japanese History* 145: 101–174 (in Japanese with English title and summary).
- Daikuhara, Yutaka 1987. *Shimebiki-hara site*. Annaka City: Annaka-shi Board of Education.
- Daikuhara, Yutaka 1988. *Shimebiki-hara II site: Sumiregaoka Park construction excavation report*. Annaka City: Annaka-shi Board of Education.
- GARF (ed.) 1989. *Glossary of the Historical Sites for Gunma Prefecture*. Maebashi: Jomo Shinbun.
- GARF 2009a. Arikasayama site. *Gunma Archaeological sites and artefacts—guide to Gunma sites* [<http://www.gunmaibun.org/remain/guide/hokumo/arikasayama.html>] accessed oct’18 but defunct link in may’19.
- GARF 2009b. Iwatubo site.” *Gunma Archaeological sites and artefacts—guide to Gunma sites* [<http://www.gunmaibun.org/remain/guide/seimo/iwatubo.html>] accessed oct’18 but defunct link in may’19.

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- GARF 2015. *Osaka site 2*. GARF Excavation reports no. 618: Archaeological excavations accompanying the construction of Yatsuba Dam no. 48. Gunma: Gunma Archaeological Research Foundation.
- GARF n.d. Fears and prayers: Gunma cultural properties—the Yayoi period. [<http://www.gunmaibun.org/osoretoinori/yayoi/yayoi03.html>].
- Gunma-ken Kyōi (ed.) 1994. *Yatsuhagi Cave*. Gunma Rejkishi Hakkutsu Saizensen. Maebashi: Gunma Prefectural Board of Education.
- Iijima, Yoshio; Miyazaki, Shigeo & Toyama, Kazuo 1986. On the extraction of human teeth in the Yayoi period from the Yatsuhagi Cave. *Bulletin of the Gunma Prefectural Museum of History* 7: 45–74 (in Japanese with English title and summary).
- Iijima, Yoshio; Miyazaki, Shigeo & Toyama, Kazuo 1987. Preliminary report of the reinvestigation on the so-called ‘secondary burial’ with special emphasis on the human bones. *Bulletin of the Gunma Prefectural Museum of History* 8: 21–50 (in Japanese with English title and summary).
- Iijima, Yoshio; Toyama, Kazuo & Miyazaki, Shigeo 1994. The significance of shell ornaments from Yatsuhagi Cave site, Gunma Prefecture.” *Bulletin of the Gunma Prefectural Museum of History* 15: 11–30.
- Inoue, Shinya 2004. *Nakanoya area site cluster 2*. Annaka City: Annaka Board of Education.
- Inoue, Shinya *et al.* 2003. *Ōkamiyama area site cluster*. Annaka City: Annaka Board of Education.
- Iseki Walker 2007–18a. Jinbo Uematsu site.” 遺跡ウォーカー [<http://www.isekiwalker.com/iseki/257057>].
- Iseki Walker 2007–18b. Kami-no-Kubo site.” 遺跡ウォーカー [<http://www.isekiwalker.com/iseki/3555>].
- Iseki Walker 2007–18c. Uwahitomi site.” 遺跡ウォーカー [<http://www.isekiwalker.com/iseki/5307>].
- Iseki Walker 2018d. Amabiki Kitsunezuka site.” [<http://www.isekiwalker.com/iseki/227407>].
- Ishikawa, Hideshi 2003. The significance of advocating a ‘Jinbo Fujitsuka-type’ for understanding Middle Yayoi pottery. *Doyō Kōko* 27: 27–53.
- Kaifu, Yōsuke 1992. Human Skeletal Remains of the Yayoi Period from the Iwatsubo Cave Site in Gunma Prefecture, Kanto District. *Jinruigaku Zasshi* 100.4: 449–483 (in Japanese with English title and summary).
- Kiryū n.d. Shinmeisan site. [<http://www.city.kiryu.lg.jp/kankou/bunkazai/maizo/iseki/1001943.html>].
- Maebashi/Takasaki Kyōi (2013) *Maebashi and Takasaki Yayoi period: pioneers of 2000 years ago*. Maebashi & Takasaki Cities: Boards of Education.
- Matsumura, H. 2001. Differentials of Yayoi immigration to Japan as derived from dental metrics. *HOMO* 52.2: 135–156 (in English).

- Miyazaki, Shigeo; Toyama, Kazuo & Iijima, Yoshio 1985. Perforated human teeth and bones in prehistoric Japan: focussing on the materials from Yatsuhagi Cave site. *Bulletin of the Gunma Prefectural Museum of History* 6: 77–108.
- Naganohara-chō 2011–12. Excavation reports. [<http://www1.town.naganohara.gunma.jp/www/contents/1361351851867/index.htm>].
- Noto, Takeshi & Kojima, Atsuko 1989. Terrain chosen for Early Yayoi-period settlements in the Kantō region. *Bulletin of Public Corporation for Archaeological Operations of Gunma* 6: 19–44.
- Ojisan 2017. Advent of the Yayoi period: settlements and burials at the time of agricultural beginnings. *Ojisan no oboegaki* [<https://plaza.rakuten.co.jp/narcisse/diary/201710150000>].
- Ono, Kazuyuki 1993. *Jinbo Fujitsuka site*. Shibukawa: GARF.
- Ooki, Shinichirou 2001. The Yayoi pottery of Gunma, in *Yayoi period pottery and burials*: 5–10. Shibukawa: GARF.
- Ooki, Shinichirou 2019. Late Yayoi period's sites in the Agatsuma River basin of Gunma Prefecture. *Bulletin of Gunma Archaeological Research Foundation* 37: 33–52.
- Shitara, Hiromi 2006. Process of the formation of farming settlements in the Yayoi period in the Kanto region. *Rekihaku Bulletin* 133: 109–153 (in Japanese with English title and summary).
- Shitara, Hiromi 2014. Yayoi culture as a complex of multiple farming cultures. *Bulletin of the National Museum of Japanese History* 185: 449–469 (in Japanese with English title and summary).
- Shitara, Hiromi & Takashe [sic], Katsunori 2014. The beginning of the cereal cultivation in the south-west Kanto District by the analysis of replica. *Bulletin of the National Museum of Japanese History* 185: 511–530 (in Japanese with English title and summary).
- Soda, Tsutomu 2019. Tephroarchaeology and its history in Japan, in G.L. Barnes & T. Soda (eds.) *TephroArchaeology in the North Pacific*: 24–40. Oxford: Archaeopress.
- Sugihara, Sōsuke 1967. Yayoi burials on Mt Iwabitsu, Gunma Prefecture. *Kokogaku Shukan* 3/4: 37–56.
- Tomioka City 2018. Yayoi rice at Kurokawa Kozuka site. *Kuroiwa Exploration Series* 34. [[http://kuroiwa-es.nc.tomioka.ed.jp/blogs/blog\\_entries/index/page:2?frame\\_id=25&page\\_id=21](http://kuroiwa-es.nc.tomioka.ed.jp/blogs/blog_entries/index/page:2?frame_id=25&page_id=21)].
- Toyama, Kazuo; Miyazaki, Shigeo and Yoshio, Iijima 1989. The significance of perforated human teeth and bones in secondary burials. *Bulletin of the Gunma Prefectural Museum of History* 10: 1–30.
- Tsukiyono-cho Kyōi n.d. Yatsuhagi Dōkutsu Iseki. *Site explanation board*.
- Watanabe, Shūichi 1986. Regional characteristics of the early Middle Yayoi in the Kantō region. *Chiba-ken Bunkazai Sentaa Kenkyū Kiyō* 10: 113–134 (in Japanese with English title).
- Yamazaki, Yoshio 1959. Excavation report on the Yayoi site of Kami-kubo, Gunma Prefecture." *Kokogaku Zasshi* 44.3: 145–149 (in Japanese).