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## Emergence of prehistoric management of plant resources during the incipient to initial Jomon periods in Japan

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### ABSTRACT

In Japan plant remains excavated from lowland sites have revealed that people managed and used plant resources, especially arboreal ones, around settlements since the early Jomon period starting at ca. 7000 cal yr BP. This management of arboreal resources mainly consisted of management and use of native *Castanea crenata* (chestnut) and introduced *Toxicodendron vernicifluum* (lacquer tree) resources. At present this management system seems to have been established suddenly at the beginning of the early Jomon period. This is partly due to the paucity of sites of the preceding incipient and initial Jomon periods that yielded plant materials. Even in these periods, however, people must have used and did some kind of management of plant resources, because the management system appearing in the early Jomon period seems to be too sophisticated to appear suddenly and includes various introduced plants beside the lacquer tree. To clarify the human–plant relationship during the incipient and initial Jomon periods, we reviewed the studies on plant remains carried out in central to northeastern Japan. Based on the collected materials, we discussed change in the human–plant relationship from the incipient and initial to the early Jomon periods from three points, change in the availability of *Castanea crenata* resources, change in people's mobility and sedentism, and submergence of sites in relation to the late Glacial to the early Holocene transgression.

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### 1. Introduction

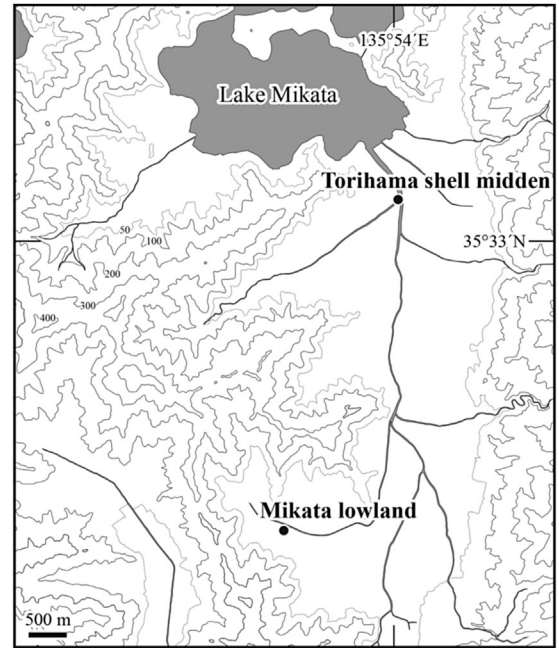
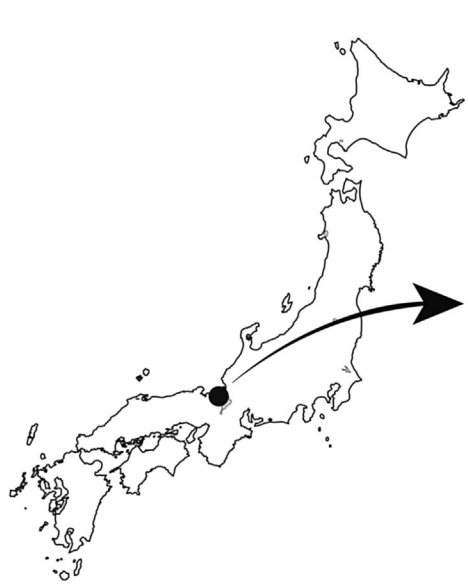
In Japan extensive studies on plant remains carried out in the past thirty years revealed that Jomon people managed and used plant resources around settlements since the early Jomon period starting at ca. 7300 cal yr BP (Noshiro and Sasaki, 2013, 2014). In eastern Japan, management and use of plant resources are recognized as intensive management and use of arboreal resources of native *Castanea crenata* (chestnut) and introduced *Toxicodendron vernicifluum* (lacquer tree) around settlements. In the preceding incipient and initial Jomon periods, on the contrary, use or management of plant resources is poorly known, because plant remains of these period occur as fragmentary wooden tools, charcoal pieces in pit dwellings, or charred building timber (Ito and Yamada, 2012), or as fruits or seeds stored in storage pits (Obata, 2011). However, an emergent system of management of plant resources must have

existed in these periods, considering the sudden appearance of a sophisticated management system in the early Jomon period. To find out how people came to recognize and use plant resources in the Japanese archipelago during the incipient and initial Jomon periods, we reviewed studies on plant remains of these periods, concentrating on the occurrence of *Castanea crenata* remains, because remains of *Toxicodendron vernicifluum* or lacquerware occur only at three sites in these periods (Minami-kayabe Town Archaeological Research Group, 2002; Suzuki et al., 2012; Kudo and Yotsuyanagi, 2015).

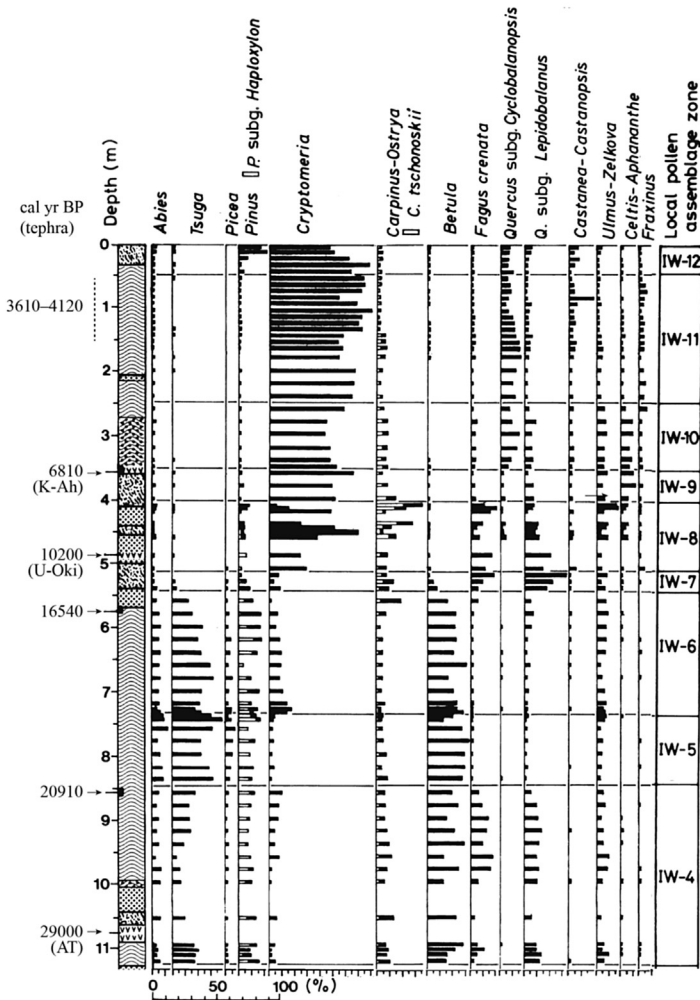
Occurrence of *Castanea crenata* in the incipient and initial Jomon periods has been reported by pollen records, fruit and seed remains, and wooden artifacts and natural woods (Table 1). Only one locality, Torihama shell midden, yielded records of the incipient Jomon period of 15,680–11,250 cal yr BP, and all others were those of the initial Jomon period of 11,250–7300 cal yr BP. Only at two localities, Torihama shell midden and Awazu Kotei site, all the three types of plant record, pollen records, fruit and seed remains, and wooden remains, were available. At other localities, only pollen records were studied. All the studied localities were distributed

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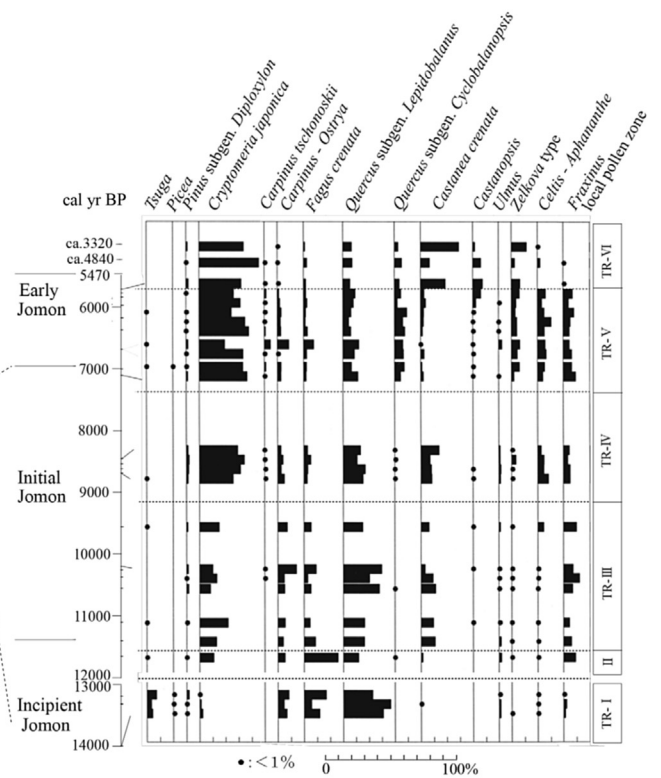
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**Mikata lowland**



**Torihama shell midden**



**Fig. 1.** Pollen spectra from the Glacial period to the Holocene in the Mikata lowland and that at the Torihama shell midden of the incipient to early Jomon periods (modified from Takahara and Tateoka, 1992b; Yoshikawa et al., 2016). Percentages based on the total arboreal pollen excluding *Alnus*. Pollen of *Castanea crenata* increased markedly at the Torihama shell midden since the beginning of the initial Jomon period.

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