

**67. Secondary Community of Palaeovegetation around  
the Middle Neolithic Mawaki Site,  
Noto Peninsula, Japan<sup>\*)</sup>**

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**Introduction.** The Mawaki Archaeological Site is located at a narrow lowland facing on Toyama Bay of Japan Sea, Central Japan. This site was a small village during the middle Neolithic age from the early Jomonian period (ca. 6,000–4,500 years ago) to the latest Jomonian period (ca. 3,500–2,200 years ago), and covers an area of 40,000 m<sup>2</sup>. The site was excavated for about five years since 1982 from the viewpoints of archaeology and the natural environment based on geology, palaeontology, and chemistry. Fossil bones of dolphins and fish, and manufactured woods in the form of an oar, a sculptured pillar as a totem pole, knittings, a wooden tray and non-manufactured woods were found in sediments of the early Jomonian to middle Jomonian periods. Also, a late Jomonian earthen mask, and the latest Jomonian large, wooden pillars were excavated. The index earthenwares of the Jomonian periods in the Hokuriku region, Japan, were included stratigraphically in thick sediment as follows: Namely, the older earthenwares have been found in the lower part of the sediments, and the later ones have been excavated from the upper part of the sediments which are about 5 m thick.

In the present paper, the author reports on palaeovegetation based upon pollen analyses, manufactured and non-manufactured woods at the site.

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**Archaeological review.** The Mawaki Site is a complex site. Many bones of dolphins identified as *Delphinus delphis* and *Lagenorhynchus obliquidens* are found in the sediments from the early Jomonian period to the middle Jomonian period. It is estimated that peoples of the Jomonian period had used dolphins for a fuel and/or food. The manufactured plant remains such as a rope, knittings, a wooden tray, an oar, and large pillars were excavated from the sediments from the early Jomonian period to the latest Jomonian period. Especially, the large pillars, 50–100 cm in diameter were found from the late stage of the latest Jomonian period (ca. 3,000–2,500 years ago), and these pillars are identified as *Castanea crenata*.

Judging from the chronology of the archaeological earthenwares and radiocarbon dating data, age of the site is ranged in the middle Neolithic age from the early Jomonian to the latest Jomonian periods.<sup>2)</sup>

**Review of the plant remains.** The plant remains from the site are divided into wood stumps as manufactured and non-manufactured woods, leaves, seeds

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Table I. Name of non-manufactured wood-stumps identified from the Mawaki Site<sup>3)</sup>

Botanic name	Specimen	number (%)
<i>Pinus densiflora</i>	121	35.2
<i>Thujopsis dolabrata</i>	39	11.3
<i>Torreya nucifera</i>	22	6.4
<i>Cephalotaxus harringtonia</i>	17	4.9
<i>Cryptomeria japonica</i>	11	3.2
<i>Abies</i>	2	0.6
conifer trees	212	61.6
<i>Castanea crenata</i>	18	5.1
<i>Acer</i>	11	3.2
<i>Quercus (Prinus)</i>	10	2.9
<i>Juglans ailanthifolia</i>	7	2.0
<i>Fagus</i>	7	2.0
<i>Maackia amurensis</i>	7	2.0
<i>Zelkova serrata</i>	5	1.5
<i>Ostrya japonica</i>	3	0.9
<i>Cercidiphyllum japonicum</i>	3	0.9
<i>Fraxinus</i>	3	0.9
<i>Carpinus (Eucarpinus)</i>	2	0.6
<i>Morus bombycis</i>	2	0.6
<i>Prunus</i>	2	0.6
<i>Aesculus turbinata</i>	2	0.6
<i>Aralia elata</i>	2	0.6
<i>Callicarpa</i>	2	0.6
<i>Cornus</i>	1	0.3
<i>Rhus javanica</i>	1	0.3
<i>Acanthopanax sciadophylloides</i>	1	0.3
deciduous broad-leaved trees	89	25.9
<i>Camellia japonica</i>	10	2.9
<i>Castanopsis</i>	9	2.6
<i>Eurya japonica</i>	8	2.3
<i>Quercus (Cyclobalanopsis)</i>	6	1.7
<i>Daphniphyllum</i>	5	1.5
<i>Cleyera japonica</i>	2	0.6
evergreen broad-leaved trees	40	11.6
<i>Elaeagnus</i>	2	0.6
woody vine	1	0.3
Total	344	100.0

and pollen grains.

(1) Non-manufactured woods: The 344 specimens were identified as 33 taxa as shown in Table I. These taxa grouped into three types as conifer trees, deciduous broad-leaved trees, and evergreen broad-leaved trees. According to a botanical study of these remains,<sup>3)</sup> the conifer trees are most dominant with about 65% of the total specimens, and the deciduous broad-leaved trees occupy a quarter of the total, while the evergreen broad-leaved trees are less abundant by only about 12%.

(2) Manufactured woods: The 83 specimens of the manufactured woods

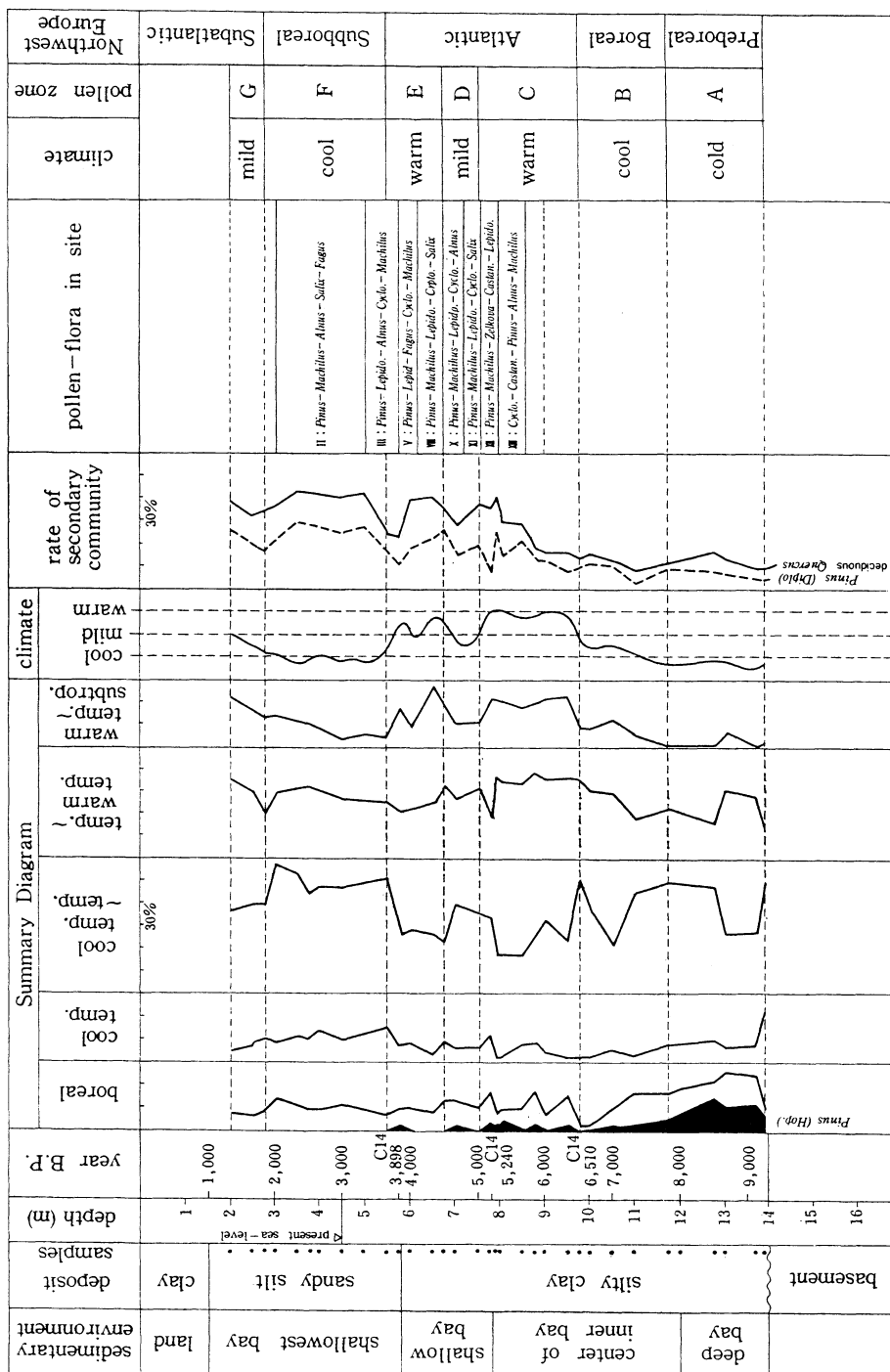


Fig. 1. Diagram showing the summary of pollen analyses, rate of the secondary community, palaeoclimate change, and comparison with the pollen zoning of Northwestern Europe.

except for three unknown specimens have been identified as 16 taxa. Among these taxa, *Castanea crenata* is most common (44%), and *Chamaecyparis obtusa*, *Torreya micifera* and *Cryptomeria japonica* are common.

(3) Leaves, seeds and cones: These macroplants found from the site are rare in a comparison with other archaeological sites. *Aesculus turbinata*, *Pinus densiflora*, and *Juglans mandshurica* are predominant.

(4) Pollen analyses: According to the pollen analyses of the 27 samples from the site, the pollen-flora at each horizon can be summarized as shown in Fig. 1. On the other hand, judging from 250 samples from the boring-well near the site, the change of pollen-flora during the Holocene epoch around the site is concluded as shown in Fig. 1.

**Discussion.** On the basis of the consideration of the macroplant and pollen fossils, the predominant taxa were *Pinus densiflora* and deciduous *Quercus* after the middle stage of the early Jomonian period. However, according to the palynological researches of the Holocene deposits, it is reported that the ever-green laurel and tall forests were predominantly spread in the coastal regions of Central Japan. Accordingly, in the Hokuriku region, judging from the palaeobotanical researches of the Postglacial deposits,<sup>1)</sup> the natural vegetation for the early and middle Neolithic ages around the site was fundamentally *Polysticho-Machiletum thunbergii* association with *Cyrtomium falcatum* sub-association in the lowland, *Polysticho-Machiletum thunbergii* with *Zelkova serrata* subassociation in the small valleys, and *Quercus salicina* forest with *Castanopsis cuspidata*, *Zelkova serrata* and *Abies firma* in the hills. However, slightly different from the general consideration, it may be said that the pine and oak forests had been spread widely around the site since the middle stage of the early Jomonian period. Dominant occurrence of the pine and oak is commonly observed in the forests of the secondary community of the vegetation at present. Therefore, it is inferred that the natural vegetation has been changed into the secondary community composed mainly of *Pinus densiflora* and deciduous *Quercus* by the Jomonian human's heavy impact around the site since the middle stage of the early Jomonian period. Additionally, it is summarized that the forests have been constructed by the mixture of plants of the Cool Temperate and Warm Temperate forests since the early Jomonian period.

#### References

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