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Preliminary

The Composition of Tree Species in the Forest Buried by the Aso-4 Pyroclastic Flow –Identification of Wooden Remains Excavated from Yato Relics in Saga Prefecture*¹

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Introduction

A large amount of wood remains buried by the pyroclastic flow at the big eruption of Mt. Aso in 80,000 years ago, so called the Aso-4 pyroclastic flow, was excavated from the lower level of Yato relics located in Kamimine-cho, Saga prefecture in Jomon era. The big trees including roots also in some case were fallen down by the pyroclastic flow, suggesting the tree are native to the site. The present study deals with the reconstruction of forest at that time by applying the wood identification technique. The climate at that time was also estimated.

Materials and Methods

The wood remains of 535 pieces excavated from the sediments of the Aso-4 pyroclastic flow were identified microscopically. Most of the wood remains was severely disintegrated and/or deformed, sometimes accompanying carbonization. The wood identification was performed by the observation of transverse, radial and tangential sections made by razor blade using a light microscope.

Results and Discussion

The results of the identification of tree species in the forest buried by Aso-4 pyroclastic flow were summarized in Fig. 1. The thirty percent of all excavated wood in the buried

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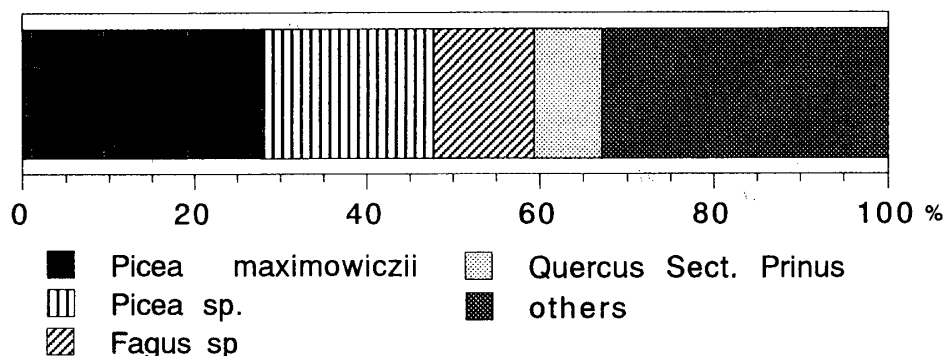


Fig. 1. The results for the identification of wood excavated from the lower level of Yato relics.

forest was identified as *Picea maximowiczii* Regel which is presently distributed only in high altitude of Yatsugatake and Minami-Alps mountains in the central Japan. The second largest amount of wood was identified as *Picea sp.* which is presently distributed from cool temperate to the subarctic zones. The total number of tree species in genus *Picea* including *Picea maximowiczii* and *Picea sp.* amounts to ca. fifty percent among all excavated wood. It is noted that tree species identified as *Picea sp.* may possibly include some amount of *Picea maximowiczii* because quite a number of wood showed spiral thickening in latewood. Therefore, the actual percentage of *Picea maximowiczii* would be much higher than 30 percent. Only small amount of *Cryptomeria japonica* and *Abies sp.* was identified. The occurrence of *Cryptomeria japonica* was confirmed in Kyushu island of 80,000 ears ago. The largest amount of broad-leaved tree was identified as *Fagus sp.* and the second largest was *Quercus sp.* sect. prinus, followed by *Stewartia sp.*, *Acer sp.*, *Fraxinus sp.*, *Carpinus sp.* and *Sorbus sp.* that are the main species in the cool temperate zone. On the contrary, some of *Distylium racemosum* Sieb. et Zucc. and *Chionanthus retusus* Lindl. et Paxton that belongs to warm temperate zone was also identified.

We estimated the climate around Yato relics in 80,000 years ago using the warmth index¹⁾. After identifying tree species of buried wood in Yato relics, we obtained the actual range of warmth index of all species and genera identified from the data book showing the distribution and temperature range of tree species in Japan island²⁾ (Fig. 2). The warmth index of ca 80 percent of all species ranged from 60° to 110°. So, we estimated that the warmth index of the tree species in the forest of Yato relics in 80,000 years ago ranged from 60° to 110°. This index corresponds to 10–14°C when converting the index value to the average temperature in a year.

In conclusion, *Picea sp.* is the most abundant habitat occupying the forest around Yato relics in Saga Prefecture in 80,000 years ago. The main species among the *Picea sp.* was *Picea maximowiczii* typical in subarctic zones. In addition to these species, the local area was covered by the forest species characterized with the dominant species of *Fagus crenata* Blume and *Quercus mongolica* Fischer ex Turez. var *grosseserrata* Rehder et Wilson which are typical in

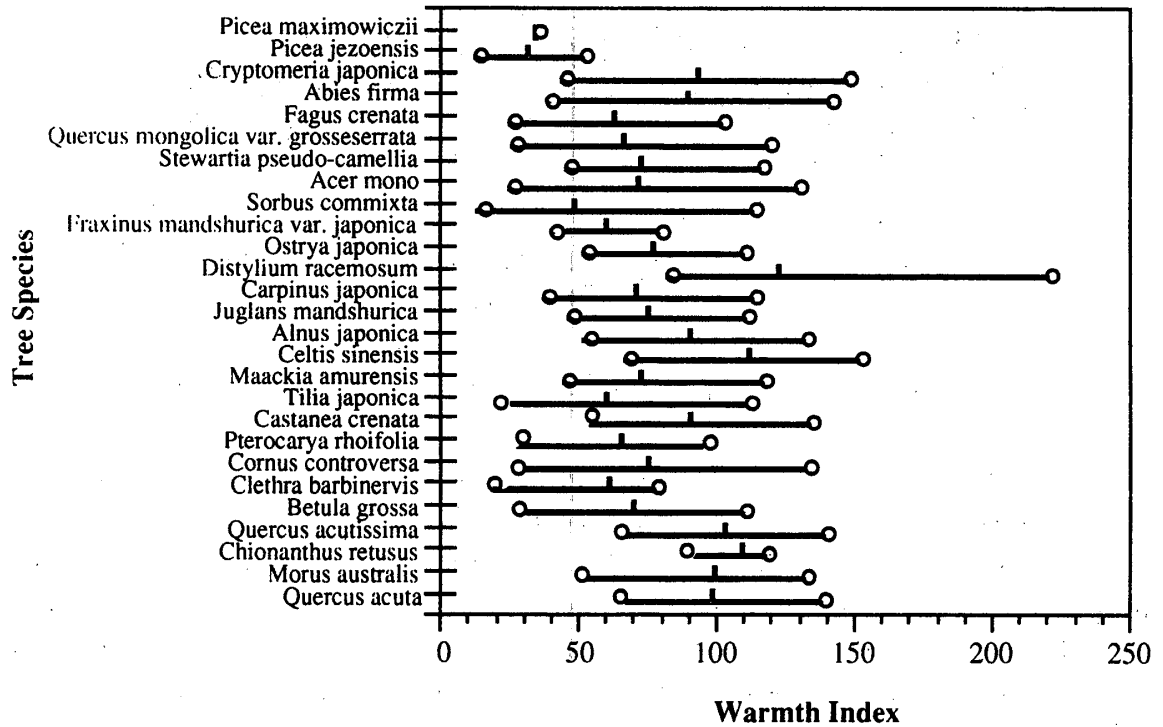


Fig. 2. Temperature ranges for the growth in different tree.

cool temperate zone.

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