On the Coppice of *Pasania edulis* Makino (Fagaceae) in Western Kyushu, Japan

by

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Introduction

Pasania edulis Makino (Fagaceae), an evergreen oak, is rarely found in any natural plant-communities in western Kyushu, Japan, while its predominating coppices are well established on foothill areas of the same region as a substitute or secondary community from which fuelwood and charcoal were obtained in the past. In contrast to the natural evergreen broad-leaf forest community of the region, which is Symploco glaucae-Castanopsietum sieboldii, 14 to 17 m tall and 50 to 100 cm d.b.h in canopy trees (Itow, 1977), *Pasania*-dominated coppices are only 6 to 10 m high and 5 to 15 cm d.b.h even in well developed stands.

Pasania-dominated communities have not been studied well as to its origin, ecology and phytosociology, excepting the *Viburnum japonicum-P. edulis* community in southern Kyushu (Miyawaki et al., 1971) and reforestations in central Honshu (Miyawaki, 1972). The present study is intended to fill the gap, providing information of *Pasania* coppices from western Kyushu.

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I. Distribution and origin of *Pasania* coppices

Pasania edulis is an endemic species to the Japanese Archipelago and is distributed on coastal areas from Kii Peninsula of central Honshu in the north, through Shikoku and Kyushu, to the Ryukyus in the south. In this range, however, it is frequently obscure whether the stand in question is natural or artificial (Hayashi, 1969). The same is true of the *Pasania*-dominated coppices found in western Kyushu, where they are abundant in Iki Island (locality nos. 1, 2 and 3 of Fig. 1), Kita-Matsuura (4, 5 and 6) and Hirado Island (7). In those areas, coppices of *P. edulis* and those of *Castanopsis cuspidata* can be found side by side on foothills. Apparently the tracts of the both coppices are the same or nearly so in physiographic, geologic, edaphic and climatic conditions. The only factor that differs between the two types of the coppices seems to be an anthropogenic one.

As to the origin of the *Pasania*-dominated coppice, an old farmer living on Hirado Island told me that acorns of *P. edulis* were embedded in soils of cutovers of *C. cuspidata* coppice and that the seedlings grew up well together with sprouts of the latter species. Since the sprouting ability is more vigorous in *P. edulis* than in *C. cuspidata*, the coppice of the latter species in which

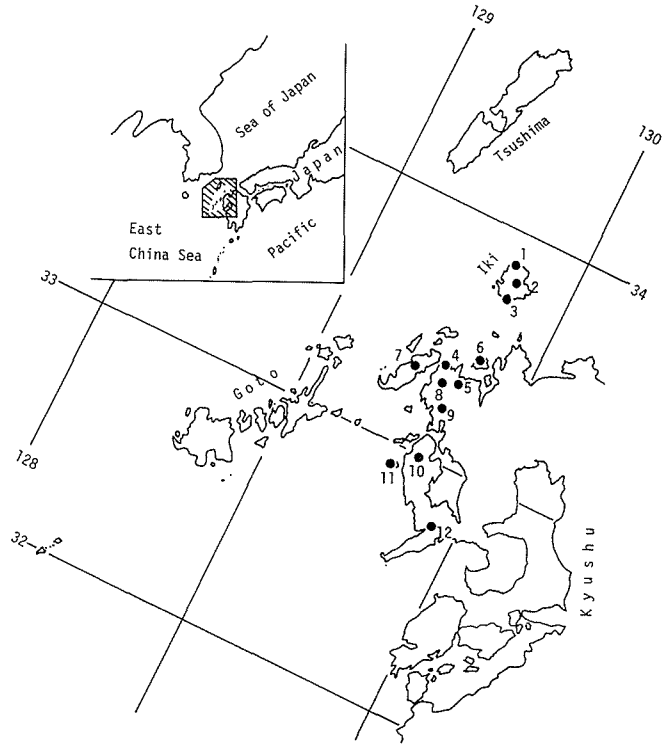

Fig. 1. Map of western Kyushu, Japan, showing localities of *Pasania edulis*-dominated coppices studied.

acorns of the former had been embedded was eventually converted to *P. edulis*-dominated coppice after several times of cutting. It is said, furthermore, that the plantation of *P. edulis* was highly recommended by the lord of the Matsuura Province in the past, to utilize its edible acorns as provisions at the time of food shortage. These stories are not incompatible with the facts that the *Pasania* coppice of western Kyushu is found only on hillsites of easy access, usually 300 m or less in altitude, abundantly in the old-day manors of the Matsuura Lord, and that *P. edulis* is very rarely found as a member of natural forests of any types. The facts and the stories lead us to a hypothesis that the present-day *Pasania* coppices of western Kyushu originated from the artificially embedded acorns, even if the species is naturally distributed in the region under consideration. The stands once established well have been maintained by the vigorous sprouting ability of the species even under periodic cutting of several decade intervals.

II. Layering structure and species composition

The sprouting from stumps is one of the important characteristics in the coppice. Sprouts immediately after the cutting are mixed with a number of shade-intolerant herbaceous and ligneous plants that are pioneers of cutover forest lands. *Erechitites hieracifolia, Miscanthus sinensis, Erigeron canadensis, Solidago*

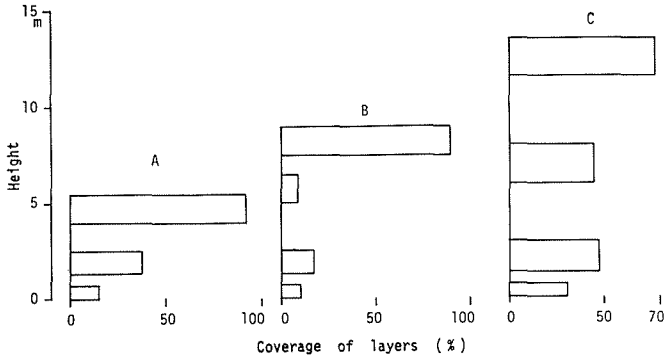

Fig. 2. A comparison of layering structure of (A) three-layered and (B) four-layered coppices of *Pasania edulis* with that of (C) natural forest of Symploco-Castanopsietum in western Kyushu, Japan.

virga-aurea, *Mallotus japonicus*, *Rhus javanica*, *Aralia elata*, *Rubus hirsutus* and *R. palmatus* are examples of such pioneers (Toyama et al., 1978). Stands regenerated to 2 m in height have a thick foliage which is enough to prevent the penetration of sun-light and, therefore, the pioneer plants stated above are disappearing from the floor. Coppices restored to 4–6 m high (Fig. 2A) support a well developed canopy that reaches 95 per cent or more in coverage and the floor vegetation at this stage is very poor due to both the poor light condition and thick litter of less decomposable fallen leaves of *P. edulis*. As the coppices grow up to some 10 m high, the layering structure mentioned above is much strengthened (Figs. 2B, 3 and 4). Such a structure is contrasting to that of natural stands of Symploco-Castanopsietum (Fig. 2C), which are about 14 m high and some 70 per cent in canopy coverage.

Fig. 3. A coppice dominated by *P. edulis*, about 7 m tall.

Fig. 4. Interior of a coppice. Note the poor floor vegetation that results from poor light condition and thick litter.

Vegetation relevés (Table 1) were collected from foothills in the range of Symploco-Castanopsietum. The Castanopsietum is distinguished from others by the presence of a number of characteristic evergreen shrubs such as *Gardenia jasminoides* (Rubiac.), *Viburnum japonicum* (Caprifoliac.), *Symplocos glauca*, *S. prunifolia* (Symplocac.), *Meliosma rigida* (Meliosmac.), *Elaeocarpus japonicus* (Elaeocarpac.), *Prunus spinosa* (Rosac.), *Lasianthus japonicus* (Rubiac.), *Antidesma japonicum* (Euphorbiac.) and *Ilex buergerii* (Aquifoliac.). In the *Pasania* coppices, however, these shrubs are absent or very infrequent excepting the first two species. The paucity of the evergreen broad-leaf shrubs results in the fact that the number of evergreen species (including herbaceous and ligneous plants) is 21 in average in the *Pasania* stand, while it is 29 in the natural stand of Symploco-Castanopsietum. In addition, neither character species nor characteritic species combination can be found in the *Pasania* coppices. This is the only feature to state as to the species composition of the coppices.

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