

Regular Paper

A simple model to analyze Japanese food customs regarding wild mushrooms

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Abstract

General thoughts about Japanese food customs regarding wild mushroom were statistically analyzed using information obtained by ethnologists. Although the distributions of the number of mushroom species used in the northeastern region and that in the southwestern region highly overlapped with each other, a significant difference was detected between the two regions. A scatter diagram representing the two counts, the number of species used and counts by subtracting the number of species that are dried from those that are salted for preservation, providing two separate clusters for the northeastern and the southwestern regions with some exceptions. These results deduced a simple model combining two factors, number of species used and method of process for preservation, to analyze Japanese food customs regarding wild mushrooms. A case study in central Japan by using this model, the transition of the custom from northeast to southwest was clearly shown in the difference of methods of preservation. Additionally, Mie Prefecture was pointed out as unique area which is a contact zone between northeast Japan, where variable species are used and preserved, and the southwest Japan where harvests are customarily dried for preservation.

Introduction

It is well known that use of wild mushrooms as food varies among countries and tribes¹⁾. These differences in the use of wild mushrooms sometimes depend on human needs and demands, sometimes on local climatic conditions and vegetation. In Japan, broad-leaved deciduous forest dominates the northeastern region, while warm temperate broad-leaved evergreen forest dominates the southwestern region as primary vegetation. It is generally believed that people in northeast Japan gather various wild mushrooms, while people in southwest Japan use fewer varieties of wild mushrooms^{2,3)}. To understand the differences in food culture regarding wild mushrooms, it is clear that the number of mushroom species used is the most important factor. However, it is unclear whether the general belief is fact or fiction, and if the

difference in the numbers of species used is continuous between the two regions.

It seems useful also to consider another factor such as the method of processing for preservation. Mushrooms generally appear seasonally, and some of their harvest is necessarily processed in the reserves for use as daily food or as winter-stock. Some food materials such as meat, fish and vegetables are usually dried, smoked, salted, pickled or fermented to keep them consumable for longer periods. It is clear that food gathering and preservation of food are the most important human activities. People in northeastern Japan often salt as winter-stock a variety of wild mushrooms appearing in autumn as well as wild vegetables harvested in spring²⁾, though, generally a few species such as 'Shiitake' *Lentinula edodes* (Berk.) Pegler, 'Koutake' *Sarcodon aspratus* (Berk.) S. Ito, and 'Kikurage', *Auricularia* species are customarily dried as in the southwest region⁴⁻⁶⁾. The former

two species, especially, are widely used as cooking materials for Buddhist memorial services or other ceremonies such as Bon and New Year festivals. In contrast, people in southwestern Japan do not preserve their harvests or may sometimes dry a few varieties but rarely salt them⁷⁾.

In the present report, the general thoughts about food customs regarding wild mushrooms in Japan were statistically analyzed. Additionally, in order to analyze the transition pattern of customs, we propose a simple model made up of two factors.

Methods

A methodical project to survey Japanese food culture have been carried out by a lot of sophisticated ethnologists located all over Japan, and a detailed description of their field work was published in fifty volumes entitled *Nihon no Shokuseikatu Zennshyu*, The Complete Works of Dietary Life of Japan (1984-1993). These works document traditional local food customs throughout Japan from ethnological viewpoints, also including use of wild mushrooms. In analyzing Japanese food customs regarding wild mushrooms, the above works provides the most complete and even information at present, as this project was concurrently performed with common interest and methodology throughout Japan. Using the descriptions of this series, we carefully counted the number of wild mushrooms used as food and checked the method of processing for preservation. The preceding suggests a tendency that two factors: the number of species used and the method of processing for preservation, may appear to correlate with each other, but the correlation between the two factors is not a relationship between independent and dependent variables or between cause and effect.

To compare the mode of the use of wild mushrooms between northeast and southwest Japan, the Mann-Whitney U-test and correlation analysis

were conducted according to the description of Sokal and Rohlf⁸⁾. Two regions, northeast and southwest of Japan, were tentatively divided along the border of natural vegetation between broad-leaved deciduous forest zone and warm temperate broad-leaved evergreen forest zone (Fig. 1). This bordering corresponds to that of two cultural regions of Japan so called *Bunatai Bunka* and *Shouyoujyurin Bunka*.

Results and Discussion

Although counts of the number of wild mushrooms used in each prefecture were not adapted to normal distribution, the Mann-Whitney U-test deduced that number of wild mushroom used between the northeast (average of 18.4) and the southwest (average of 10.5) of Japan is significantly different ($U = 366$, $t = 3.15$, $P < 0.01$). This result agrees with the general belief that people in the northeastern region consumed more varieties of mushrooms than people in the southwestern region. However, the distribution of the counts of each region was highly overlapped. The above results indicated that one or more additional factors were required to distinguish the mode of customs between the two regions.

Fig. 2 shows a scatter diagram representing the counts of two factors, number of species used and counts by subtracting the number of species that are dried from those that are salted for preservation. For the latter factor, the number of salted species gives variation within the northeastern region and the number of dried species gives variation within the southwestern region. Species that are both salted and dried for preservation were counted both salted species and dried species. It showed a significant positive correlation between the two factors ($r = 0.534$, $P < 0.01$) and two clusters which to be formed by the northeastern and the southwestern regions were separately depicted in the upper right and the lower left in the

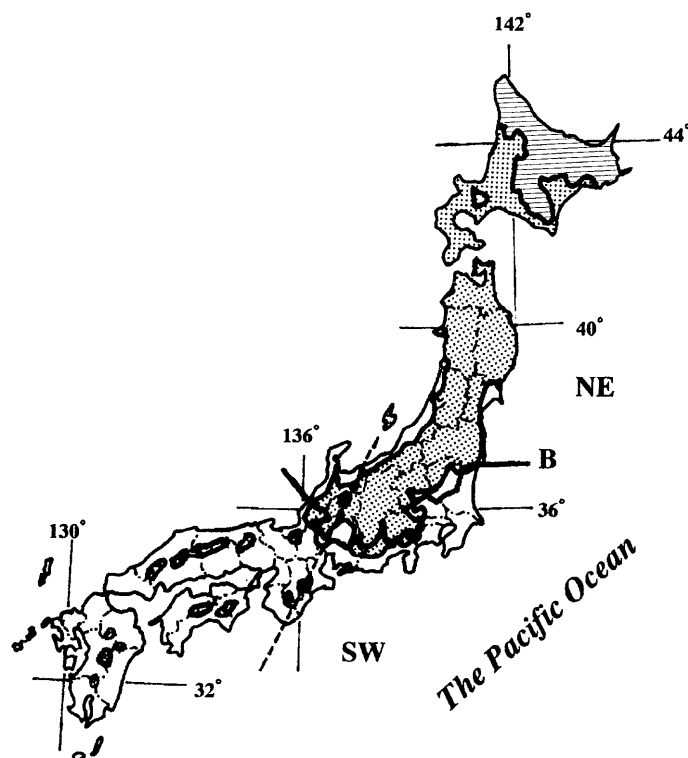





Fig. 1 Map of natural vegetation of Japan and tentative border line (B) of the two cultural regions, the northeastern region (NE) and the southwestern region (SW), of food customs regarding wild mushrooms. Broken line traversing central Japan: see text. Potential natural vegetation zone: , alpine, subalpine and subarctic conifer forest zone; , deciduous broad-leaved forest zone; , broad-leaved evergreen forest zone.

diagram, respectively, with some exceptions. It should be noted that the two regions having different food customs coincide with natural vegetation zones by which the two cultural regions are tentatively divided. This analysis also revealed that some plots with large deviations from the cluster of corresponding region. The plot of Hokkaido, located at the northeast end of Japan, showed a large deviation from the cluster formed by the northeastern region. This large deviation is attributable to the contribution of unique food customs of 'Ainu' who are natives of this area and whose customs are completely different from those of the people of the northeastern region of mainland Japan. They use more than ten kinds of mushroom species and preserve most kinds by a drying process similar as other foods such as

salmon, deer meat, and vegetables⁹. It was also pointed out that plots of three prefectures located in the southwestern region, Tottori¹⁰, Okayama¹¹, and Hiroshima¹², were distributed in the cluster formed by the northeastern region. Although there is no comprehensive answer on cause of such a deviation, this area is an interesting insular spot and further analysis is necessary.

From the above results, we proposed a simple model combining the two factors to analyze Japanese food customs regarding wild mushrooms as shown in Table 1. It is interesting to consider the transition patterns of food customs at the contact zones between regions having customs different from each other. Table 2 shows a case study analyzing transition patterns in the mode of the use of wild mushrooms among five prefectures

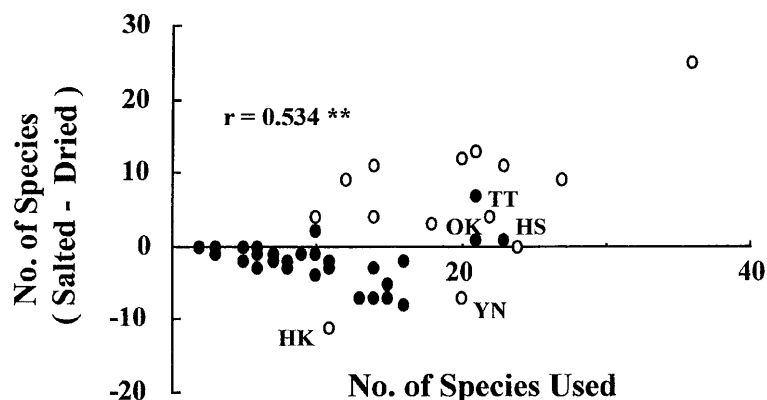


Fig. 2 Scatter diagram depicting the two cultural regions for food customs regarding wild mushrooms. Open and closed circles represent prefectures in the northeastern region and the southwestern region, respectively. The open circles with HK and YN represent Hokkaido and Yamanashi, and the closed circles with TT, OK, and HS represent Tottori, Okayama, and Hiroshima, respectively.

Table 1. General trend in use of wild mushrooms in Japan represented by a model combining two factors.

No. of species used	Processing for preservation		
	Salting	Drying	Not preserved
Many	Northeastern		
Few		Southwestern	Southwestern

Table 2. Transition of mode of use of wild mushrooms at a contact zone of different food customs in central Japan.

Prefecture (Region)	Total no. of species used	Families ^{a)}	No. of species processed for preservation			References
			Salting	Drying	Not preserved	
Toyama ^{a)} (NE)	10	PL, TR, ST, RA, PO	4	0	6	13)
Gifu ^{b)} (NE)	24	PL, H, TR, ST, C, B, TH, SC, PO, RA, AU	8	8	9	14), 15)
Mie (SW)	20	PL, H, TR, ST, C, B, RU, TH, RA, AU	0	12	8	16), 17)
Nara (SW)	13	TR, C, B, SC, RU, TH, RA	0	7	6	7), 18)
Wakayama (SW)	11	TR, C, TH, RU, RA, AU	0	2	9	19)

^{a)}: Species and family names were not estimated for some mushrooms described by only local name in the literature.

^{b)}: *Ramaria botytis* (Pers.) Ricken was counted in both salting and drying.

^{c)}: Abbreviations of family name: PL, Pleurotaceae; H, Hygrophoraceae; TR, Tricholomataceae; ST, Strophariaceae; C, Cortinariaceae; B, Boletaceae; RU, Russulaceae; RA, Ramariaceae; TH, Thelephoraceae; SC, Scutigeraeae; PO, Polyporaceae; AU, Auriculariaceae.

along a section from the northeast to the southwest in central Japan (broken line in Fig. 1) using the proposed model. In this analysis, field surveys preliminarily carried out by the present authors, except for Toyama Prefecture, added two species,

Tricholoma auratum (Fr.) Gillet and *Suillus bovinus* (L.: Fr.) O. Kuntze in Nara Prefecture⁷⁾ and twelve species, *Pleurotus ostreatus* (Jacq.: Fr.) Kummer, *Hygrophorus russula* (Schaeff.: Fr.) Quél., *T. auratum*, *T. fulvocastaneum* Hongo, *Naematoloma*

sublateritium (Fr.) Karst., two of *Cortinarius* species, *Suillus luteus* (L.: Fr.) S. F. Gray, *Auricularia* sp., and three of unknown species called 'Shirashimeji', 'Yukitake', and 'Katagitake' in Mie Prefecture¹⁷⁾ to the ethnologists' descriptions^{16,18)}. The transition of the customs from northeast to southwest was clearly shown in methods of preservation. People in Toyama salt 40% of their harvests but dry nothing; in Gifu, they salt about 30% and dry 30%, while people in Mie, Nara, and Wakayama dry some harvests but never salt them. It is interesting to note the case in Mie Prefecture where many kinds of species were used and preserved as in the northeastern region, while the harvests were not salted but frequently dried as in the southwestern region. The present model will be useful to appreciate the transition patterns of the food customs at the contact zones between regions having different custom from each other. In these last few decades of disappearing local names of species and traditional customs, cooperative work with ethnologists and mycologists is required for further analysis of this problem.

和文摘要

日本の野生きのこ食習慣を分析するための簡単なモデル

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日本の野生きのこ食習慣に関する一般論について、民俗学者によって得られた情報を統計学的に分析した。東北日本と西南日本のそれぞれにおいて利用されるきのこの種数の分布は互いに大きく重複したが、両地域間で有意な差があった。2つの要因、利用種数および保存のために塩蔵される種数と乾燥される種数との差を用いた散布図において両地域は互いに異なるクラスターを形成した。これらの結果から、日本の野生きのこ食習慣を分析するための、利用種数および保存方法

からなる簡単なモデルを提唱した。このモデルを用いた中部日本における事例分析において、東北日本から西南日本に至る食習慣の推移が保存方法の差異によって明瞭に示された。さらに、三重県は多様なきのこを利用し保存する東北日本および収穫物を乾燥保存する西南日本の接触地帯として注目された。

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