

GATHERING AND SUBSISTENCE PATTERNS AMONG THE P'URHEPECHA INDIANS OF MEXICO¹

JAVIER CABALLERO N.

CRISTINA MAPES S.

*Jardin Botanico, Instituto de Biologia
Universidad Nacional Autonoma de Mexico
Ciudad Universitaria
Coyoacan 04510, Mexico, D.F.*

ABSTRACT.—The P'urhepecha Indians, also known as "Tarascans" supplement their subsistence agriculture by gathering edible mushrooms and numerous vascular plants. In addition they collect honey produced by several species of wasps. Many species of plants are gathered for medicinal uses, firewood, ornaments or household needs. These plants are collected throughout the year from agricultural fields as well as from the natural environment. For the P'urhepecha, gathering is a part of a complex year round subsistence pattern based on multiple uses of their natural resources.

RESUMEN. La recolección es una práctica de gran importancia para la subsistencia entre los indios P'urhepecha, o Tarascos, del Lago de Patzcuaro, Michoacán, México. Ellos recolectan hongos, miel y larvas de ciertas especies de avispas, y numerosas plantas comestibles. De estas últimas, 36 especies son las mas importantes. Se recolectan tambien diversas especies de plantas con fines medicinales, para combustible, como adorno o para uso doméstico. La recolección se realiza tanto en el medio ambiente natural como en los campos cultivados en diferentes epocas del año.

Con base en los datos presentados, se discute el significado que tiene la recolección. Se plantea que la persistencia de esta práctica, mas que ser un síntoma de pobreza, es un rasgo propio de la cultura P'urhepecha. Se señala que la recolección es en realidad parte importante de un complejo patron de subsistencia basado en el uso múltiple de los recursos naturales.

INTRODUCTION

Studies of subsistence patterns in agricultural societies usually consider agriculture to be the only productive practice, giving too little attention to gathering, hunting and fishing. With the exception of works of Pennington (1963, 1968), Bye (1979), Messer (1978), Felger and Moser (1976), Wilken (1979), among others, the importance of gathering in past and present agrarian societies has not been seriously considered. However, even today, these practice activities are significant in terms of the amount and diversity of products for indigenous farmers in Mexico.

In this paper we describe the present role and patterns of gathering among the P'urhepecha² Indians, also known in the literature as the Tarascans. For these people, living in the Region of Lake Patzcuaro, in the Mexican state of Michoacan, gathering is part of a complex subsistence and plant use pattern based on multiple uses of their natural resources.

We report herein on a portion of the results of our multidisciplinary research project on traditional knowledge, use and management of natural resources in the Lake Patzcuaro basin. The majority of our field work was carried out between early 1978 and late 1980. Ethnobotanical data and voucher specimens were obtained in the field and market places with the aid of 50 native consultants. Herbarium specimens are deposited in the Herbario Nacional (MEXU) of the Instituto de Biologia, Universidad Nacional Autonoma de Mexico. Mexico.

THE SETTING

The Lake Patzcuaro Basin is one of the three regions that form the modern day geographic area of the P'urhepecha culture. In prehispanic times this region was the main center of the P'urhepecha empire. Despite the processes of social and cultural change, it is still one of the most extensive areas of indigenous culture in Mexico.

The study area (Figure 1), known as the Lake Patzcuaro Basin, is located in the Transverse Neovolcanic Belt, in the northern part of the state of Michoacan. It forms part of the lacustrine system which also includes the Valley of Mexico. The area is approximately 1,000 km² and ranges from 2,043 to 3,200 m in elevation, with five obvious physiographic zones: the islands in the lake, the shoreline, the hillsides, the intermountain valleys, and the mountains. The lake itself occupies about 100 km². The basin is bordered by high mountain ranges on the west, north and south. The geography of the area is discussed in detail by Barrerra (1985).

Although the climate is temperate (mean monthly temperature is 16°C), with mild winters, several degrees of below freezing temperatures often occur during December and January. A well-marked dry season extends from November to May, and the rainy season is from June to October. Annual precipitation is about 1,000 mm (see Garcia, 1973, for details of the climate).

In terms of the interrelations between the people in the environment two major landscapes can be identified: the "natural" environment and the transformed or anthropogenic environment. Areas supporting primary and secondary vegetation are herein termed the natural environment. Forests are often dominated by oaks (*Quercus* spp.), pines (*Pinus* spp.), and fir (*Abies religiosa*) with intervening shrub and grasslands. The natural ecosystems of Lake Patzcuaro are represented by three communities of hydrophytes occurring in the characteristic Zonation in relation to the shoreline (Caballero et. al.

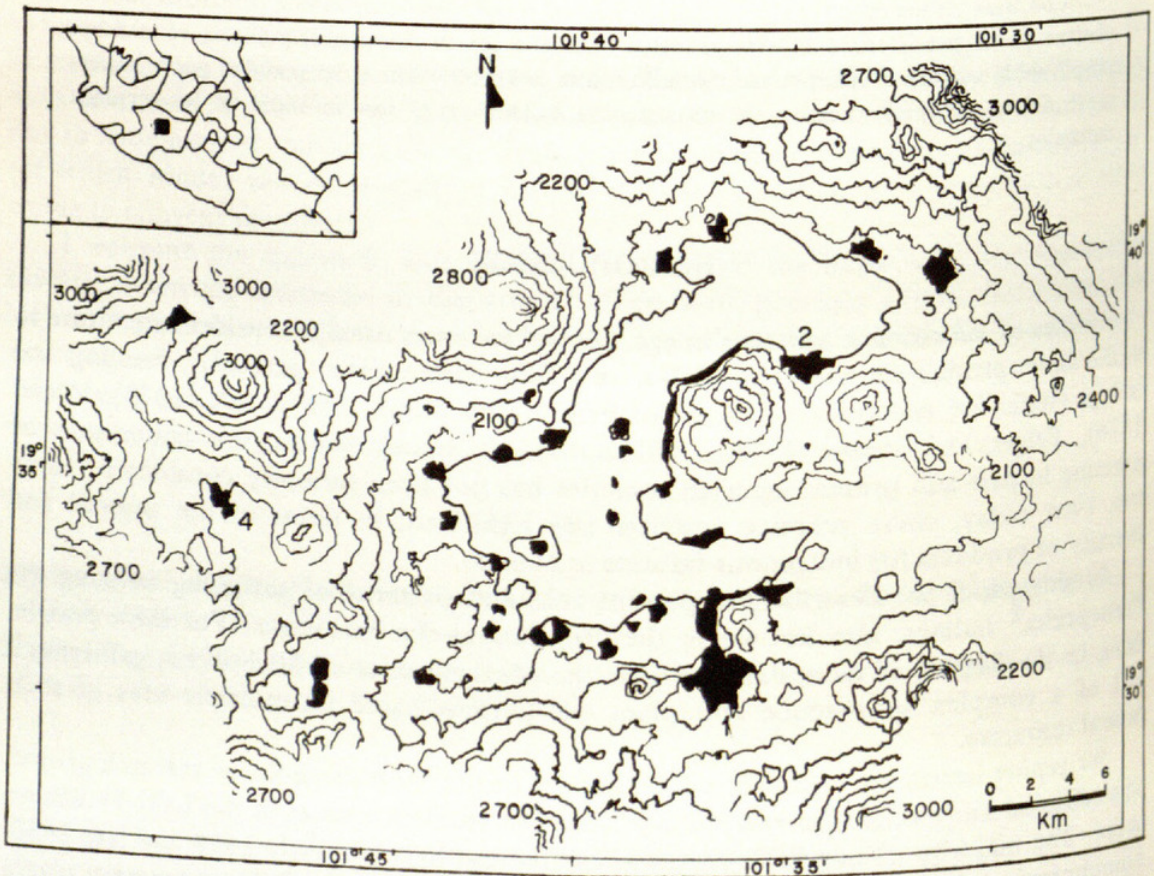


FIG. 1.—Lake Patzcuaro Basin (Based on Comision de Estudios del Territorio Nacional 1977, and Gorenstein and Pollard 1983), showing major settlements. 1 = Patzcuaro, 2 = Tzintzuntzan, 3 = Quiroga, 4 = Pichataro. Contour interval: 100 meters.

1981, Toledo et. al. 1980). We have recorded approximately 500 vascular plant species in the region, and estimate the total flora to include 600 to 700 species.

The transformed environment is made up of areas devoted to agriculture, cattle and human settlement. The population of nearly 80,000 inhabitants is distributed in about 100 towns and villages. The P'urhepecha population constitutes nearly 25% of the total and is located in all of these island, shore and mountain settlements.

P'URHEPECHA ECONOMY

The P'urhepecha economy is based on agriculture, fishing, and folk art (artesanas). Agriculture is the most important and widespread economic activity among the P'urhepecha. Almost all of the harvest—maize, beans, squash, and wheat—is for self-consumption. In addition to these common crops, 16 species and numerous varieties of fruit trees—mostly pears, apples, and peaches—are cultivated in kitchen gardens (Toledo, et. al., 1980). They cultivate fifteen species of vegetables near the lakeshore. Fishing is an important traditional activity and fourteen species of fish are obtained from the lake (Toledo, et. al., 1980). Animal husbandry is mostly limited to chickens and turkeys, although some people raise a few pigs. Most families have one or two oxen and a few families own a cow. Hunting, once an important activity, is no longer significant. Today it is restricted to squirrels, rabbits, and about eight species of migratory ducks (Foster, 1948). The most important folk arts are ceramics, weaving based on hydrophytes (*Scirpus* spp. and *Thypha* spp.), and many different wooden objects such as furniture, masks, kitchen utensils, and sculpture.

GATHERING

Patzcuaro Basin P'urhepecha use has been recorded for 224 species of wild native and naturalized vascular plants (Table 1). However, not all of these plants are currently gathered. Approximately 60 species, or 25% of the useful flora are commonly gathered, and these are mainly plants used for food and firewood. The majority of the 224 useful species have been used for medicinal purposes. Various plants are also gathered for ornamental use, fodder, and tool making which includes a variety of household utensils.

Gathering is usually carried out in association with agriculture, and is done mainly by the men although at times the women also participate. Every morning while walking to his parcel of land, the man takes note of things he will gather and carry back with him upon his return. In general these observations are made with no preconceived plan. In addition both men and women make special trips to gather teas and mushrooms to sell in markets, medicinal plants also to be sold in markets, and special foods for their own use which they consider to be delicacies.

EDIBLE PLANTS

Fruits and roots of certain plants are commonly eaten in the field as snacks or candies or to allay thirst, but are not brought home. These include the root of *Phaseolus heterophyllus* which is eaten like *jicama* (*Pachyrrizus erosus*) and *Solanum cardiophyllum* which has small tubers like common potato (the men stop to cook it in the field during their agricultural labors). The P'urhepecha have shown and told us about certain plants which they know to be edible but they do not gather or eat them.

TABLE 1.—Plant uses in the Lake Patzcuaro Basin.

Use	No. Species	Use	No. Species	Use	No. Species
Medicinal	99	Fodder	9	Toys	4
Food	30	Flavorings	7	Dye	3
Household Utensils	20	Construction	7	Poisons	2
Firewood	16	Tools	4	Insecticides	7
Ornament	12	Tannins	4	Magical, Religious	

In general, wild edible plants are an important complement to the everyday diet, even though most of daily nutrition is provided by the products of agriculture: maize, beans, squash, and wheat. Collected plants are consumed mainly in the form of fruits, greens, and teas (Table 2). Mushrooms are an important input to the diet but only during the rainy season. Of the 43 species of fungi known to be eaten (Mapes et. al. 1981), only 10 are regularly gathered. These most highly esteemed species are gathered by the people for their own use and to sell in the markets. The P'urhepecha commonly consume these mushrooms in soups or cooked with "chiles" (*Capsicum annuum* and *C. pubescens*) and other spices and vegetables.

"Quelites," or greens, are among the more important food plants gathered in the region. As with the Tarahumara (Bye 1981), the *quelites* gathered used by the P'urhepecha are commonly associated with agriculture and anthropogenic vegetation. Also, as in the case of the Tarahumara, we believe that P'urhepecha "*quelites*" are undergoing active processes of domestication. Nine species are considered as "*quelites*" and are collectively called *xakua* in the P'urhepecha language (Table 2). Among their more important quelites are *Amaranthus hybridus*, *Brassica campestris*, and *Chenopodium berlandieri*. "*Quelites*" are usually cooked with "*chiles*" and mixed with fish, meat or beans.

Several species of plants provide sweets and condiments. For example the young inflorescence stalks of *Agave inaequidens* are collected in January and cooked and eaten as deserts. Plants used as condiments include *Tagetes micrantha* and two species of wild *Physalis*.

Commonly gathered fruits of arborescent species include *Crataegus pubescens*, *Morus microphylla*, *Opuntia* spp., and *Prunus serotina* spp. *capuli*. Among non-arborescent plants that provide fruit, the most important are *Gonolobus numularis* and *Rubus adenotrichos*. *Gonolobus* fruit, known as *talayote*, is highly esteemed. It is toasted and then eaten.

FIREWOOD

The most important firewood trees (Table 3) are pines, oaks, and two species of alder (*Alnus*). Certain shrubs, such as *Baccharis conferta*, are also used as fuel. The selection of one or another species depends on the kind of fire desired and availability. For example, pine wood is used when an intense and fast-burning fire is needed, and oak or alder wood is used when a longer-lasting fire is desired.

Firewood for domestic consumption is usually gathered only from dead, fallen trunks and branches found on the forest floor; living branches and trees are not cut for domestic firewood. In contrast, there is intensive use of both living trees and dead wood for firing ovens for commercial bread and pottery making. This use is one of the most important causes of deforestation in the region and is responsible for the ever-increasing distances from the villages to the forests. Long walks are now required to obtain firewood.

MEDICINAL PLANTS

The major uses of medicinal plants are to prevent or cure illnesses of the digestive tract, respiratory system, female reproductive system, traumas, and various illnesses of domestic animals. Medicinal plants are also employed to cure supernatural illnesses such as *susto* (popular term used for an ailment provoked by a sudden and disagreeable experience, Viesca et. al., 1976).

Clay (1981) pointed out four possibilities of medical choice in Pichataro, a mountain town in the Patzcuaro Basin, and the same conditions seem to hold true for the P'urhepecha in general. These alternatives are: (1) self treatment, (2) *curanderos* (folk healers or practitioners of folk medicine), (3) social service practitioners (*pasantes*, medical students fulfilling their social service obligation), and (4) physicians. These alternatives may represent consecutive steps in treating an illness. Treatment decision

TABLE 2.—Common edible wild-gathered plants in the Lake Patzcuaro Basin. A = maize and wheat fields, and fallow fields, B = shrublands of *Baccharis* spp. (derived from pine/oak forests), G = grasslands with xerohpytic plants such as *Acacia* spp., and *Opuntia* spp., O = oak forests, P = pine forests, M = specimens collected only in markets.

Type of Food and Species	Habitat	Months of Procurement
Fruits		
<i>Casimiroa edulis</i>	B	April-May
<i>Crataegus pubescens</i>	B, P	October-January
<i>Gonolobus numularis</i>	A	September-October
<i>Jaltomata procumbens</i>	A	August-October
<i>Morus microphylla</i>	B	June-August
<i>Opuntia joconostle</i>	G	October-January
<i>Opuntia tomentosa</i>	G	June-September
<i>Prunus serotina</i>	B, P	July-October
<i>Rubus adenotrichos</i>	B	March-May
<i>Solanum mozinianum</i>	A	July-October
Greens		
<i>Amaranthus hybridus</i>	A	March-July
<i>Amaranthus</i> sp.	A	March-July
<i>Brassica campestris</i>	A	May-September
<i>Chenopodium berlandieri</i>	A	March-June
<i>Reseda luteola</i>	A	January-May
<i>Rumex crispus</i>	A, G	January-December
<i>Rumex conglomeratus</i>	G	January-December
<i>Sycios microphylla</i>	A	August
Teas		
<i>Agastache mexicana</i>	P, O	May-November
<i>Bidens ostruthoides</i>	P, O	January-December
<i>Hedeoma piperatum</i>	P, O	September-October
<i>Satureja laevigata</i>	P, O	December-February
Sweets and Condiments		
<i>Agave inaequidens</i>	G, B	January
<i>Physalis acuminata</i>	A	March-December
<i>Physalis pubescens</i>	A	August-November
<i>Tagetes micrantha</i>	A, G	January-December
Mushrooms		
<i>Agaricus campestris</i>	P, B, G	June-November
<i>Amanita caesarea</i>	P, B	June-November
<i>Armillariella tabescens</i>	M	May-September
<i>Boletus edulis</i>	P, O	July-September
<i>Calvatia cyathiformis</i>	M	August-September
<i>Helvella crispa</i>	P, O	July-November
<i>Laccaria laccata</i>	P, O	August-October
<i>Lyophyllum decastes</i>	P, O	May-September
<i>Ustilago maydis</i>	A	August-October
<i>Xerocomus spadiceus</i>	P	July-September

TABLE 3.—Firewood plants from the Lake Patzcuaro Basin.

<i>Alnus acuminata</i> Subesp. <i>glabrata</i>	<i>Pinus pseudostrobus</i>
<i>Alnus jorullensis</i>	<i>Pinus teocote</i>
<i>Baccharis conferta</i>	<i>Quercus castanea</i>
<i>Pinus lawsoni</i>	<i>Quercus crassipes</i>
<i>Pinus leiophylla</i>	<i>Quercus laeta</i>
<i>Pinus michoacana</i> var. <i>cornuta</i>	<i>Quercus obtustata</i>
<i>Pinus montezumae</i>	<i>Quercus rugosa</i>

may depend on five criteria: (1) the seriousness of the illness, (2) the knowledge or availability of an appropriate home remedy, (3) faith in the effectiveness of folk treatment as opposed to modern medical treatment, (4) the expenses of each alternative, and (5) the availability of the different medical resources.

The first and second alternatives (self treatment and treatment by the curanderos) involve the use of wild-collected medicinal plants. Self treatment is generally a domestic routine in most households, and involves a basic set of plants. Almost all of these plants are collected when needed, by both men and women, in areas near their homes. However, in some cases medicinal plants are purchased at the market (*El Mercado*) at Patzcuaro. Some of these wild-collected and market-purchased plants are also widely used elsewhere in Mexico for the same purposes: common examples are *Gnaphalium* spp., *Sida rhombifolia*, and *Tagetes* spp. (Table 4). The majority of curanderos are men, and they almost always collect their own medicinal plants. They frequently store their plants in a dried form in order to have them on hand when needed.

ORNAMENTAL PLANTS

Gathering of ornamental, or decorative plants is a common activity. During civic religious celebrations, groups of people collect branches and flowers of several species to adorn churches and other public places. It is also commonplace among the P'urhepecha to decorate their homes with flowers which are almost always wild-gathered. Some of the most important wild ornamental plants are orchids, such as *Laelia* spp. and *Habenaria clypeata* (Table 4).

OTHER USES

The gathering of wild plants to make soap and a variety of household utensils (Table 4) has been declining in recent years. Nowadays most of the people prefer to purchase manufactured soaps and household utensils such as brooms. Nevertheless, the people recognize that using local plants is cheaper and usually more effective. On the other hand, gathering certain shrubs to make work implements, such as fish traps or cattle-herding poles, is still a common practice.

Although most of the plants gathered are destined for family consumption, there are some species which are collected in substantial quantity and sold in several regional markets. In some cases the P'urhepecha themselves sell these plants in markets as far away as Guadalajara and Mexico City. For the most part these are several fruits, such as *Crataegus pubescens*, *Prunus serotina*, and *Rubus adenotrichos* and certain teas, such as *Satureja laevigata* and to a lesser extent *Agastache mexicana*. The mushrooms often sold in these distant markets are *Amanita caesarea*, *Hypomyces lactifluorum*, *Ramaria flava*, and *Ustilago maydis*.

WASPS

The honey gathered from certain wasps is appreciated even more than honey from domestic bees. Wasp honey is eaten daily, and especially esteemed during the local

TABLE 4.—Common non-edible gathered plants. A = maize and wheat fields and fallow fields, B = bushlands of *Baccharis* spp. (derived from pine/oak forests), F = fir forests, G = grasslands with xerophytic plants such as *Acacia* spp., and *Opuntia* spp., H = hydrophytes, O = oak forests, pine forests.

Kind of Use	Species	Habitat
Medicines		
Febrifuges	<i>Artemisia mexicana</i>	B
	<i>Bidens pilosa</i>	B, G
	<i>Chenopodium murale</i>	A
Antidiarrheatics	<i>Cestrum nitidum</i>	P, O
	<i>Lepechinia caulescens</i>	P, B
	<i>Sida rhombifolia</i>	B, G
Antiespasmotics	<i>Tagetes lucida</i>	B, G
Cough drops	<i>Argemone ochroleuca</i>	A
	<i>Cosmos bipinnatus</i>	B
	<i>Gnaphalium burgovii</i>	B, G
Analgesics	<i>Montanoa grandiflora</i>	B
Alleviate liver sickness	<i>Berberis moranensis</i>	G
	<i>Berula erecta</i>	H
Alleviate kidney sickness	<i>Equisetum hymale</i>	H
	<i>Eryngium carlinae</i>	P
Ornaments		
to adorn homes	<i>Begonia gracilis</i>	B, O
	<i>Bidens aequisquama</i>	G, O
	<i>Rumfordia floribunda</i>	B, G
to decorate altars & churches	<i>Abies religiosa</i>	F
	<i>Castilleja tenuifolia</i>	G, B
	<i>Habenaria clypeata</i>	O
	<i>Laelia grandiflora</i>	O
Household Utensils		
soaps	<i>Michrosechium ruderales</i>	G, B
	<i>Phytolacca icosandra</i>	G, B
brooms	<i>Baccharis conferta</i>	B
	<i>Heimia salicifolia</i>	G, B
to wash dishes	<i>Erhetya mexicana</i>	G
	<i>Salvia mexicana</i>	B
Work Implements		
fish traps	<i>Ceanothus coeruleus</i>	B

fiestas (religious celebrations such as those dedicated to certain saints and weddings). We have identified two species of wasps which provide the P'urhepecha with honey: *Polybia occidentalis* subsp. *nigratella* Brysson, and *P. parvulina* Richards. In addition, the larvae of another wasp, *Vespula pensylvanica* Saussure, are gathered as a delicacy. This wasp makes subterranean nests, locally called *talpanales*, in the pine forest. Groups of people go to dig up the nests. This activity is a social event, similar to the collecting of *talayote* (*Gonolobus*) fruit. The larvae are taken home and toasted or cooked with *chile colorado* (red chile sauce).

GATHERING IN SPACE AND TIME

The P'urhepecha of the Lake Patzcuaro Basin collect products from the natural environment as much as from agricultural lands. The *milpas* (cultivated fields) and fallow fields provide the people with some of their most important food plants such as *quelites* (greens) as well as medicinal plants. These are mostly collected in maize fields but sometimes also may be taken from wheat fields. Shrub lands with *Baccharis* spp. and grasslands provide important fruits, e.g., *Crataegus pubescens*, *Gonolobus numularis*, *Opuntia* spp., *Prunus serotina* and *Rubus adenotrichos*. Oak and coniferous forests provide mushrooms, teas, and firewood. All of these plant communities provide medicinal plants, but on a comparative basis, the fallow fields and anthropogenic vegetation are the major sources of medicinal plants (Figure 2).

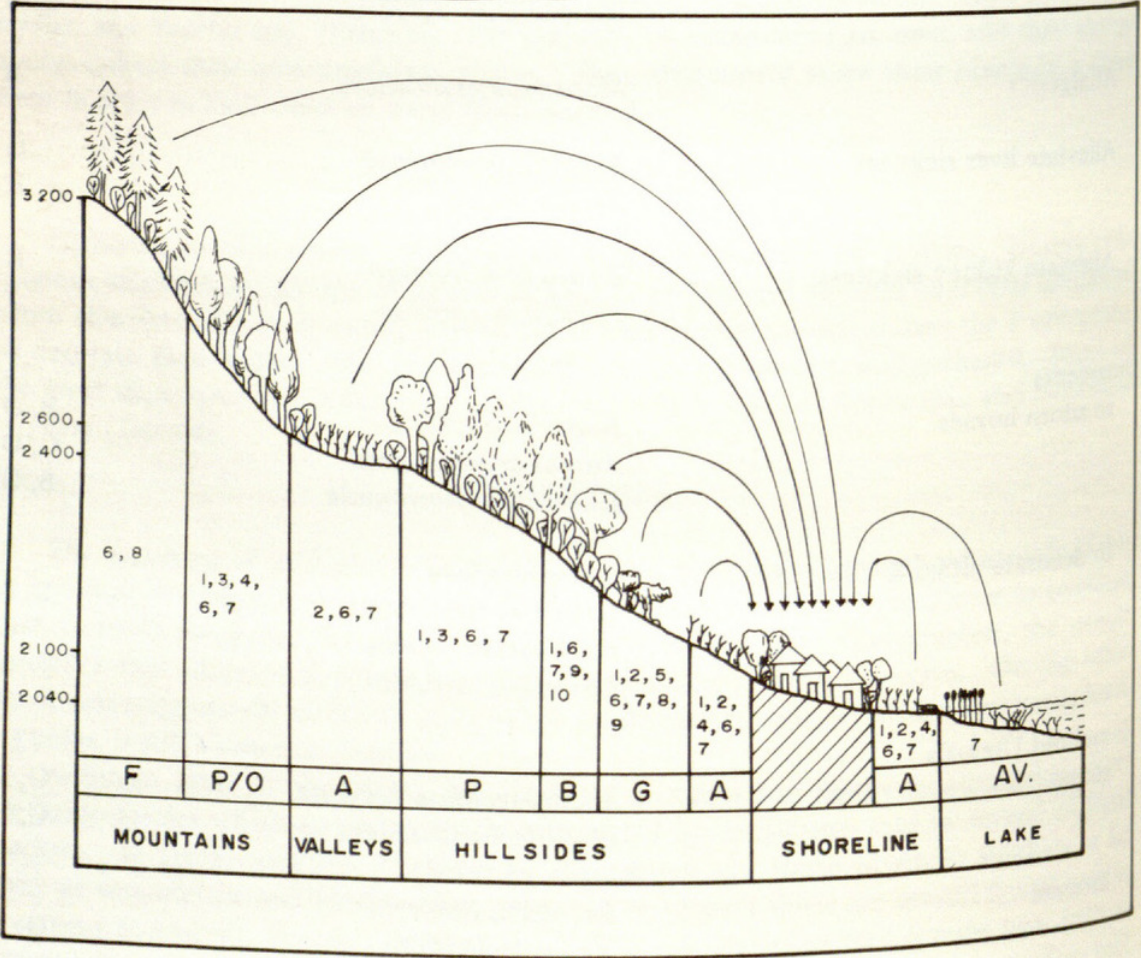


FIG. 2.—Profile showing origins of wild-gathered plants and products in the Lake Patzcuaro Basin. F = fir forest, P/O = pine, oak and mixed forests, A = maize and wheat fields, and fallow fields, P = pine forest, B = shrublands with *Baccharis* spp., G = grasslands with xerophytic plants such as *Acacia* and *Opuntia* spp., H = aquatic plant communities. 1 = fruits, 2 = greens, 3 = teas, 4 = condiments, 5 = sweets and condiments, 6 = mushrooms, 7 = medicinal plants, 8 = ornaments, 9 = household utensils, 10 = work implements.

The various wild-gathered plant products are available seasonally, and this is especially important in the case of the food plants. Almost all of the wild edible plants are gathered during the rainy season. There is an enormous variety and quantity of wild edible plants products available from July through September. The P'urhepecha say that during the rainy season there is such abundance of wild plant-derived food that it cannot all be used: "*es tanta la comida que hay que se desperdicia.*" In contrast, during the dry season, from November through May and especially in January and February, the quantity of available wild food products is much less. Nevertheless, there are important dry season wild harvests, e.g., certain important teas such as *Satureja laevigata*, and edible fruits of *Casimiroa edulis*, *Crataegus pubescens*, and *Rubus adenotrichos*. The latter is available from the end of the dry season through the beginning of the rainy season (Figure 3). With the exception of these teas, wild-gathered edible plants are not stored.

On the other hand, medicinal plants and firewood are collected the year round. Some medicinal plants are stored dried for use when needed and plants for household and work implements are likewise often stored.

Various ornamental plants are available throughout the year. According to the date of the celebrations, there are specific flowers for each *fiesta*. For example, the beautiful orchid *Laelia autummalis* is the flower for the "*dia de muertos*" (Day of the Dead) in November, while *Laelia grandiflora* is one of the flowers for the "*fiesta de Corpus*" (Feast of Christ) in June.

THE SIGNIFICANCE OF GATHERING

Wilken (1969) pointed out that animal and plant gathering in the highlands of Mexico have commonly associated with poverty. Some anthropological studies of the P'urhepecha reaffirm this concept. Beals (1946) says that gathering is important only

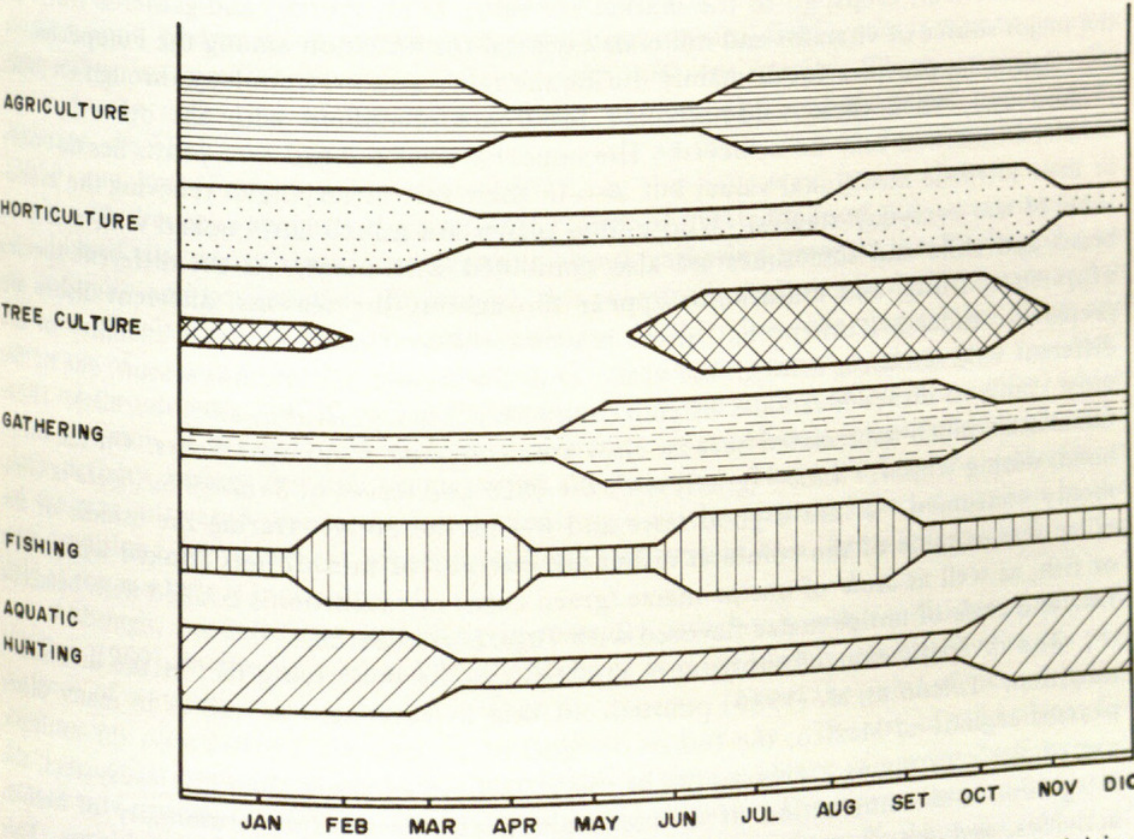


FIG. 3.—Availability of food products according to the different productive activities throughout the year. Thickness of the bars is diagramatic and not necessarily proportional to the amount of the production obtained.

in times of hunger or as an occasional practice to bring variety into the diet. Brand (1951) describes that use of more than 30 plant species for food, dying, household utensils and other different purposes. However, he states that these plants do not play an important role in the life of the majority of the people of the Municipio of Quiroga in the Patzcuaro Basin. Foster (1948) points out that at the time of his study gathering was not a significant economic activity at Tzintzuntzan due to the state progress reached by people.

Certainly in the region of Lake Patzcuaro the gathering of food plants and animals has a low prestige among the non-Indian population. Nevertheless, a remarkable persistence of this practice is observed among the P'urhepecha. There are several levels of significance of this practice to the life of the P'urhepecha. Of course, gathering provides fruit for emergency and during times of need or economic stress, wild plants have been a generalized source of food. Not only supplementary foods have been obtained but also some substitutes for ordinary staples. The older men and women remember when they ate tortillas of maize mixed with acorns during the Mexican Revolution of 1910-1917. Today people say that they gather wild plants when there is nothing else to eat. However, in another sense, some people say that they gather plants or honey to give as gifts to friends at occasions of social events. As it is currently practiced, gathering affords a meaningful input to the agricultural subsistence. In addition to firewood and medicines, gathering provides dietary diversity.

Through the year, the primary dietary sources are maize in its multiple forms, beans and "chile". Secondly, wheat is part of the basic diet. It is consumed as bread and sometimes mixed with maize and made into "tortillas." These constitute the basic source of protein and energy. Protein is also obtained from fish from the lake and, to a lesser extent, by meat from chickens or pigs. At certain times of the year other cultivated plants, mainly 'squash' and some fruits, provide additional food, vitamins and minerals. In the lakeshore towns some vegetables are grown. Most of these, as well as most of the planted tree fruit crops, go to the market for sale. Thus, *quelites* and gathered fruits are the major source of vitamins and minerals essential for nutrition among the Purepecha.

Gathering provides foods mainly during the rainy season, from May through October (Figure 2). When these wild-harvested foods are combined with the other foods, a balanced nutrition may be achieved. The importance of the gathered plants lies not only in their intrinsic nutritional value, but also in their role in varying or relieving the monotony of the everyday staples. Wild edible plants are mixed and cooked with maize or beans and chile and sometimes are also combined with meat. As the different species of *quelites*, fruits, and mushrooms appear throughout the seasons, different dishes are prepared. Indeed, P'urhepecha cuisine is wonderfully attuned to the availability of the different wild resources through the year. Thus during the dry and hot season, one of the most common dishes is tamales of maize with "blackberry" (*Rubus adenotrichos*). These tamales are much appreciated because they are made with fresh ingredients. On the other hand, during winter, "atole" (gruel) with the chile and leaves of *Satureja laevigata* is commonly consumed. It has a good taste and warms the body. During the middle of the rainy season some of the common dishes are *quelites* or mushrooms cooked with beans or fish, as well as *atole* of unripe maize (green corn) or mushrooms cooked with beans or fish, and *atole* of unripe maize flavored with *Tagetes micrantha*.

The diversification of subsistence strategies is the underlying fact in the diversified nutrition. Toledo et. al. (1980) pointed out that in Patzcuaro as well as in many other peasant regions of Mexico, the Indian patterns of subsistence are based on the multiple use of the ecosystems. This results in the utilization of more than one ecosystem, the integration and combination of different practices, the multidimensionality of human activities, and the diversification of the products obtained from each ecosystem. This strategy may operate as much on the level of the family as at the level of the entire region. This pattern is carried out through time and space. On the spatial axis maximum utilization is sought of all of the available ecosystems. In terms of time, the goal is to

obtain a maximum number of necessary products which each ecosystem offers throughout the year.

This diversified gathering strategy has formed the basis of the P'urhepecha society development since antiquity, as has been documented in the studies of Pollard (1982), Caballero (1982) and Gorenstein & Pollard (1983) on the protohistoric P'urhepecha (Tarascan) cultural system. Upon these basis gathering, as a forming part of a complex subsistence strategy, could be regarded as a practice that possesses a very long tradition.

Palynological or archeological evidences for P'urhepecha plant gathering are lacking, and there are no clear references to plant gathering in historical documents such as the *Relacion de Michoacan* (1541) or the *Relaciones Geograficas de la Diocesis de Michoacan* (1579-1580). However, reports of use, consumption or economic exchange of non-cultivated plants does occur in these sources. Moreover, on the basis of the *Relacion de Michoacan*, Gorenstein and Pollard (1983) state that non-cultivated fruits such as *capulin* (*Prunus serotina*), *tejocote* (*Crataegus pubescens*), *tunas* (*Opuntia* spp.) and *zapote blanco* (*Casimiroa edulis*) formed part of the diet of the ancient P'urhepecha.

Quelites, or *xakua*, have been to the P'urhepecha as the cultivated vegetables have been to the European culture. Although there are no specific references on their early use in the Lake Patzcuaro region, clear reports are provided for other areas. For example, in the *Relaciones de Tuxpa and Jiquilpan* (*Relaciones geograficas de la Diocesis de Michoacan*, 1579-1580) reports on consumption of *quelites*:

"Las comidas de que antiguamente usaban dicen que eran de maiz y frijoles y benados y chile y muchos generos de yerbas cocidas."

"... y la comida de ellos era tortillas, tamales, frijoles y otras yerbas de la tierra que se dicen quiletes."⁴

Gorenstein and Pollard (1983) identified *xakua* of the P'urhepecha region as *Chenopodium* spp. However, on the basis of our ethnobotanical field works it may be assumed that *xakua*, or *quelites*, involves at least eight different species. There are many references to the collecting of firewood and use of non-cultivated medicinal plants in the *Relacion de Michoacan* and other sources such as the works of Francisco Hernandez (1959) and Fray Francisco Ximenez (1888). In the same way, oral tradition among the modern P'urhepecha suggests the past importance of plants for food and other purposes.

Indeed, the most significant features about gathering among the P'urhepecha are its antiquity and persistence. In general, this practice is declining in the Patzcuaro region because of cultural and socioeconomic changes. Habits for collecting certain plants and the ways of consumption are disappearing. For example, certain meals such as "*tamales*" with mushrooms or the "*atole*" with "*aguamiel*" (fresh unfermented *Agave* juice) which were common in the past are no longer prepared. Nevertheless, plant collecting is still a daily activity among the less acculturated P'urhepecha. Many P'urhepecha gather most of the non-cultivated plants resources mentioned in the historical documents and in the oral tradition. Moreover, at present, gathering of certain teas, fruits and mushrooms for sale at the markets is increasing.

Although, modern day gathering is normally associated with conditions of poverty (Wilken 1969), in the case of the P'urhepecha it is more closely associated with the persistence of a strong cultural tradition than to poverty. From the point of view of industrial society the P'urhepecha live in conditions of poverty. The use of wild plants for food and other basic needs has often been taken as clear evidence of poverty by European ethnocentric members and modern agroindustrial society. These processes must be critically considered in the light of integral man-nature relations from P'urhepecha culture of antiquity to the present day. The persistence of gathering throughout history is not an incidental fact! It corresponds to man-nature interaction which has proven its adequacy for thousands of years. The better understanding of the cultural, socioeconomic and

biological factors involved in this process could form the basis for more rational use of natural resources by the present and future societies.

ACKNOWLEDGMENTS

We thank our P'urhepecha friends of the Lake Patzcuaro region for their hospitality, patient and generous assistance. This study was done as a part of the "Etnobiologia P'urhepecha del Lago de Patzcuaro" research project. We thank, too, the Direccion General de Culturas Populares, Subsecretaria de Cultura y Recreacion, Secretaria de Educacion Publica, of Mexico for financial support. The encouragement of anthropologist Leonel Duran was invaluable. We thank Drs. Robert Bye and Richard Felger for reading, commenting on and correcting the English version. We also thank Dr. Robert L. Jeanne from the Department of Entomology from the University of Wisconsin, Madison and Dr. O. W. Richards from London, England, for the identification of the wasp specimens collected for this study.

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NOTES

¹An earlier version of this paper was presented by J. Caballero, C. Mapes and N. Barrera at the 3rd Conference of Ethnobiology in Tucson, Arizona in March 1981. The present paper is a revised and modified version of that presentation.

²The P'urhepecha names used in this paper are written phonetically according to the criteria of Gomez, Perez and Rojas (1984).

³It appears to be a common fact in all the Mesoamerican cultural area.

⁴"Foods that they were using, they say that they were maize and beans and deer and chile and many kinds of pot herbs." (Relacion de Tuxpa).

"... and their foods were tortillas, tamales, beans and other herbs of the land that they name quiletes." (Relacion de Jiquilpan).

In the relation of Jiquilpan the word quelites was erroneously written as quiletes.

APPENDIX 1.—Vascular Plants utilized by the P'urhepecha in the Lake Patzcuaro Basin. 1 = species, 2 = family, 3 = life form, 4 = plant part utilized, 5 = P'urhepecha name, 6 = Spanish name, 7 = collection number. (J. Caballero & C. Mapes).

Abies religiosa H.B.K.; 2 - Pinaceae 3 - tree; 4 - leaves; 5 - *kumcbkari*; 6 - oyamel; 7 - 648, 1009, 1102.

APPENDIX 1. (continued) — Vascular Plants utilized by the P'urhepecha in the Lake Patzcuaro Basin. 1 = species, 2 = family, 3 = life form, 4 = plant part utilized, 5 = P'urhepecha name, 6 = Spanish name, 7 = collection number. (J. Caballero & C. Mapes).

- Agastache mexicana* (Kunth.) Lint et Epling; 2 - Labiatae; 3 - shrub; 4 - leaves and flowers; 5 - *tsintsun tseraku*; 6 - toronjil morado, toronjil blanco; 7 - 1007, 1069, 1249.
- Agave inaequidens* Koch.; 2 - Agavaceae; 4 - floral peduncle; 5 - *akamba*; 6 - maguey; 7 - 1034.
- Alnus acuminata* subesp. *glabrata* (Fernald) Furlow; 2 - Betulaceae; 3 - tree; 4 - stems and branches; 5 - *its'u pamu*; 6 - aile; 7 - 309, 1245.
- Alnus jorullensis* H.B.K.; 2 - Betulaceae 3 - tree; 4 - stems and branches; 5 - *tepamu*; 6 - aile 7 - 85, 135, 158, 348.
- Amaranthus hybridus* L.; 2 - Amaranthaceae; 3 - herb; 4 - leaves and stems; 5 - *kurintsi xakua*; 6 - quelite de cerdo; 7 - 674, 714, 785.
- Amaranthus retroflexus* L.; 2 - Amaranthaceae; 3 - herb; 4 - leaves and stems; 5 - *kuchiri xakua*; 6 - quelite de cochino; 7 - 714.
- Argemone ochroleuca* L.; 2 - Papaveraceae; 3 - herb; 4 - flowers; 5 - *xate*; 6 - chicalote; 7 - 205.
- Artemisia mexicana* Willd.; 2 - Compositae; 3 - herb; 4 - the whole plant; 5 - *tsauangueni*; 7 - 995.
- Baccharis conferta* H.B.K.; 2 - Compositae 3 - shrub; 4 - branches; 5 - *karatakua*; 6 - jara; 7 - 146, 865, 947.
- Begonia gracilis* H.B.K.; 2 - Begoniaceae; 3 - herb; 4 - flowers; 5 - *kaxurakua*; 6 - sangre de doncella; 7 - 276, 307, 403.
- Berberis moranensis* Hebenstr. et. Ludw.; 2 - Berberidaceae; 3 - shrub; 4 - stems; 5 - *tiripu*; 7 - 277, 837.
- Berula erecta* Huds. Cav.; 2 - Umbelliferae; 3 - hydrophyte; 4 - the whole plant; 5 - *xurburbe*; 7 - 937.
- Bidens aquisquama* (Fer.) Scherff.; 2 - Compositae; 3 - herb; 4 - inflorescences; 5 - *xarbhikamata, andan*; 6 - aceitilla; 7 - 104, 489, 520, 776.
- Bidens ostruthoides* (DC.) Sch. Bip.; 2 - Compositae; 3 - herb; 4 - leaves and stems; 6 - te de lima; 7 - 646.
- Bidens pilosa* L.; 2 - Compositae; 3 - herb; 4 - the whole plant; 5 - *ts'umu*; 6 - aceitilla; 7 - 639, 728.
- Brassica campestris* L.; 2 - Cruciferae; 3 - herb; 4 - leaves; 5 - *nipajipikun mortansa*; 6 - mortanza, nabo; 7 - 35, 114, 325, 682, 787, 1113.
- Casimiroa edulis* Llave et lex; 2 - Rutaceae; 3 - tree; 4 - fruit; 5 - *uruata*; 6 - zapote blanco; 7 - 421, 892.
- Castilleja tenuifolia* Mart & Gal; 2 - Scrophulariaceae; 3 - herb; 4 - aerial parts; 5 - *char-rangi*; 6 - flor de San Miguel; 7 - 667, 778.
- Ceanothus coeruleus* Lag.; 2 - Rhamnaceae; 3 - shrub; 4 - branches; 5 - *charen, ticberin*; 6 - membriguillo; 7 - 345, 454, 578, 824, 1001.
- Cestrum nitidum* Mart & Gal; 2 - Solanaceae; 3 - shrub; 4 - leaves; 5 - *xupian*; 6 - hedi-ondilla; 7 - 1063, 1098.
- Chenopodium berlandieri* Moq.; 2 - Chenopodiaceae; 3 - herb; 4 - leaves; 5 - *japujuka-kura xakua*; 7 - 979, 1117.

APPENDIX 1. (continued) — Vascular Plants utilized by the P'urhepecha in the Lake Patzcuaro Basin. 1 = species, 2 = family, 3 = life form, 4 = plant part utilized, 5 = P'urhepecha name, 6 = Spanish name, 7 = collection number. (J. Caballero & C. Mapes).

- Chenopodium murale* L.; 2 - Chenopodiaceae; 3 - herb; 4 - leaves; 5 - *xakua turipiti*; 6 - quelite; 7 - 1263.
- Cosmos bipinnatus* Cav.; 2 - Compositae; 3 - herb; 4 - flower; 5 - *xarhikamata*; 6 - girasol; 7 - 67, 718, 827.
- Crataegus pubescens* (H.B.K.) Steud.; 2 - Rosaceae; 3 - tree; 4 - fruits; 5 - *karax*; 6 - tejocote; 7 - 63, 148, 783, 839, 928.
- Ehretia mexicana* Watson; 2 - Borraginaceae; 3 - tree; 4 - leaves; 5 - *tuminix*; 6 - tumin; 7 - 840.
- Equisetum hymale* L.; 2 - Equisetaceae; 3 - hidrophyte; 4 - the whole plant; 5 - *xurburbe*; 6 - cola de caballo; 7 - 593.
- Eryngium carlinae* Delar.; 2 - Umbelliferae 3 - herb; 4 - the whole plant; 5 - *kuanas*; 6 - hierba del sapo; 7 - 254, 371, 803, 1251.
- Gnaphalium burgovii* Gray 2 - Compositae; 3 - herb; 4 - leaves; 6 - gordolobo; 7 - 711; C. Mapes 43.
- Gonolobus numularis* Hemsl.; 2 - Asclepiadaceae; 3 - vine; 4 - fruits; 6 - talayote; 7 - 1024.
- Habenaria clypeata* Lindl.; 2 - Orchidaceae 3 - herb; 4 - the whole plant; 5 - *xanuata*; 6 - granizo; 7 - 503.
- Hedeoma piperatum* Benth.; 2 - Labiatae; 3 - herb; 4 - leaves and flowers; 5 - *paraxuin*; 7 - C. Mapes 43.
- Heimia salicifolia* (H.B.K.) Link.; 2 - Lythraceae; 3 - shrub; 4 - branches; 5 - *its'u tarimu*; 7 - 404.
- Jaltomata procumbens* (Cav.) J.L. Gentry 2 - Solanaceae; 3 - herb; 4 - fruit; 5 - *potsekua*; 7 - 413.
- Laelia grandiflora* Lindl.; 2 - Orchidaceae; 3 - epiphyte; 4 - the whole plant; 5 - *tsiktsiki its'umakua*; 6 - flor de Corpus; 7 - 1136.
- Lepechinia caulescens* (Ort.) Epling; 2 - Labiatae; 3 - herb; 4 - leaves or roots; 5 - *xenxenekua*; 6 - sonajita; 7 - 502.
- Microsechium ruderae* Naud.; 2 - Cucurbitaceae; 3 - vine; 4 - roots; 5 - *apopin*; 7 - C. Mapes 32.
- Montanoa grandiflora* Hemsl.; 2 - Compositae; 3 - shrub; 4 - leaves; 5 - *parakua*; 6 - vara blanca; 7 - 618, 738.
- Morus microphylla* Buckl.; 2 - Moraceae; 3 - tree; 4 - fruit; 6 - mora; 7 - C. Mapes 502 (voucher specimen in alcohol).
- Opuntia joconostle* Weber in Duguet; 2 - Cactaceae; 4 - fruits; 6 - joconol; 7 - 1141.
- Opuntia tomentosa* Salm-Dyck; 2 - Cactaceae; 4 - fruits; 5 - *pare cbarapiti*; 6 - tuna roja; 7 - 1139.
- Phaseolus heterophyllus* Willd.; 2 - Leguminosae; 3 - vine; 4 - roots; 5 - *kuxturuxkua*; 6 - jicamita; 7 - 282.
- Phytolacca icosandra* L.; 2 - Phytolaccaceae; 3 - shrub; 4 - fruits; 5 - *konguera*; 7 - 142, 392, 686.
- Physalis acuminata* Greenm.; 2 - Solanaceae; 3 - herb; 4 - fruits; 5 - *chapindikua*; 6 - tomatillo; 7 - C. Mapes 45.

APPENDIX 1. (continued) — Vascular Plants utilized by the P'urhepecha in the Lake Patzcuaro Basin. 1 = species, 2 = family, 3 = life form, 4 = plant part utilized, 5 = P'urhepecha name, 6 = Spanish name, 7 = collection number. (J. Caballero & C. Mapes).

- Physalis pubescens* L.; 2 - Solanaceae; 3 - herb; 4 - fruits; 5 - *toma*; 6 - miltomate; 7 - 1248.
- Pinus lawsoni* Roezl.; 2 - Pinaceae; 3 - tree; 4 - branches; 5 - *pukuri aparikua*; 6 - pino ortiguillo; 7 - 130, 417, 991, 1181.
- Pinus leiophylla* Sch. et Cham.; 2 - Pinaceae; 3 - tree; 4 - branches; 5 - *pukuri urus*; 6 - pino chino; 7 - 29, 79, 155, 208, 365, 804, 954.
- Pinus michoacana* var. *cornuta* Martinez, 2 - Pinaceae; 3 - tree; 4 - branches; 5 - *pukuri tepajkua*; 6 - pino lacio; 7 - 78, 211, 366, 395.
- Pinus montezumae* lam.; 2 - Pinnaceae; 3 - tree; 4 - branches; 5 - *pukuri tepajkua*; 6 - pino lacio; 7 - 137, 182, 611, 929.
- Pinus pseudostrobus* Lindl.; 2 - Pinaceae; 3 - tree; 4 - branches; 5 - *pukuri kansimbo*; 6 - pino lacio; 7 - 159, 212, 367, 616, 927.
- Pinus teocote* Schl. et Cham.; 2 - Pinaceae; 3 - tree; 4 - branches; 5 - *pukuri aparikua*; 6 - pino ortiguillo; 7 - 18, 31, 71, 384, 546, 638, 954.
- Prunus serotina* subesp. *capuli* (Cav.) Mc Vaugh; 2 - Rosaceae; 3 - tree; 4 - fruits; 5 - *xengua*; 6 - capulin; 7 - 125, 133, 157.
- Quercus castanea* Nee; 2 - Fagaceae; 3 - tree; 4 - branches; 5 - *urikua urapiti*; 6 - encino blanco; 7 - 64, 115, 269, 353, 481, 505, 700, 805, 1169.
- Quercus crassipes* H. et B.; 2 - Fagaceae; 3 - tree; 4 - branches; 5 - *urikua tsirapsi*; 6 - encino chilillo; 7 - 74, 354, 561, 658, 911.
- Quercus laeta* Liebm.; 2 - Fagaceae; 3 - tree; 4 - branches; 5 - *urikua urapiti*; 6 - encino blanco; 7 - 171, 270, 356, 483, 627.
- Quercus obtusata* H. et B.; 2 - Fagaceae; 3 - tree; 4 - branches and wood; 5 - *urikua tukus*; 6 - encino tukus; 7 - 46, 152, 218, 390, 492, 801, 1175.
- Quercus rugosa* Nee; 2 - Fagaceae; 3 - tree; 4 - branches; 5 - *urikua turipiti*; 6 - encino prieto; 7 - 73, 163, 271, 355, 582, 656, 825, 958.
- Reseda luteola* L.; 2 - Resedaceae; 3 - herb; 4 - aerial parts; 5 - *kuaranikua ts'pambiti*; 7 - 881.
- Rubus adenotrichos* Cham et Schl.; 2 - Rosaceae; 3 - vine; 4 - fruits; 5 - *situni*; 6 - zarzamora; 7 - 134, 774.
- Rumex crispus* L.; 2 - Polygonaceae; 3 - shrub; 4 - leaves; 5 - *pupurajkura*; 6 - lengua de vaca; 7 - 812, 1111, 1119.
- Rumex conglomeratus* Murr.; 2 - Polygonaceae; 3 - shrub; 4 - leaves; 5 - *kuablanikua*; 7 - 887.
- Rumfordia floribunda* DC.; 2 - Compositae; 3 - shrub; 4 - inflorescences; 5 - *ts'ikts'iki melonixh*; 7 - 651, 1008, 1131.
- Salvia mexicana* L.; 2 - Labiatae; 3 - herb; 4 - leaves; 5 - *charajkukua*; 6 - chia; 7 - 320, 432, 539, 663, 710, 838, 1075.
- Satureja laevigata* Standl.; 2 - Labiatae; 3 - shrub; 4 - leaves, flowers and branches; 5 - *nurbiteni*; 6 - te nurite, te de monte; 7 - 585, 828, 859.
- Sida rhombifolia* L.; 2 - Malvaceae; 3 - shrub; 4 - leaves; 5 - *itskipin*; 7 - 447, 537, 66, 726, 878.

APPENDIX 1. (continued) — Vascular Plants utilized by the P'urhepecha in the Lake Patzcuaro Basin. 1 = species, 2 = family, 3 = life form, 4 = plant part utilized, 5 = P'urhepecha name, 6 = Spanish name, 7 = collection number. (J. Caballero & C. Mapes).

Solanum cardiophyllum Lindl.; 2 - Solanaceae; 3 - herb; 4 - tubers; 5 - *papax*; 6 - papa cimarrona; 7 - 1019.

Solanum mocinianum Dun.; 2 - Solanaceae; 3 - herb; 4 - fruits; 5 - *pachindikua*; 6 - bebere gato; 7 - C. Mapes 23.

Sycios microphylla H.B.K.; 2 - Cucurbitaceae; 3 - vine; 4 - leaves; 5 - *akarbeni*; 6 - chayotillo; 7 - C. Mapes 1.

Tagetes lucida Cav.; 2 - Compositae; 3 - herb; 4 - aerial parts; 5 - *kurujkumin*; 6 - Santa Maria; 7 - 80, 378, 499, 754, 902, 1029, 1205.

Tagetes micrantha Cav.; 2 - Compositae; 3 - herb; 4 - leaves; 5 - *putsuti*; 6 - anis; 7 - 770, 790.

APPENDIX 2.—Fungi used for food by the P'urhepecha in the Lake Patzcuaro Basin. 1 = species, 2 = P'urhepecha name, 3 = Spanish name, 4 = collection number. (C. Mapes, deposited in the Herbarium of the Escuela Nacional de Ciencias Biologicas of the Instituto Politecnico Nacional, ENCB).

Ascomycetes

Hypocreales

Hypomyces lactiflorum (SCW. ex Fr.) Tul; 2 - *kuxtereko*; 3 - trompa de puerco.

Pezizales

Helvella crispa Scop. ex Fr.; 2 - *sirat angants urapiti*; 3 - oreja de raton blanca; 4 - 26, 29.

Basidiomycetes

Ustilaginales

Ustilago maydis (DC.) Corda; 2 - *t'ukuru*; 3 - viejito; 4 - 97.

Hymenomycetes

Aphyllorphorales

Clavariaceae

Ramaria flava (Fr.) Quel.; 2 - *k'uin ants'ir terekua*; 3 - patita de pajaro; 4 - 27, 28.

Agaricales

Tricholomataceae

Armillariella tabescens (Scop. ex Fr.) Sing; 2 - *paxakua*; 3 - montoncito; 4 - 95.

Laccaria laccata (Scop. ex Fr.) Berk & Br.; 3 - sikitereko; 4 - 96.

Lyophyllum decastes (Fr.) Sing.; 2 - *parakua*; 3 - montoncito; 4 - 3.

Amanitaceae

Amanita caesarea (Scop. ex Fr.) Grev.; 2 - *tiripiti terekua*; 3 - hongo amarillo; 4 - 14, 23, 24, 78.

Agaricaceae

Agaricus campestris L. ex Fr.; 2 - *tepajkua terekua*; 3 - llanero; 4 - 117, 121.

Boletaceae

Boletus edulis Bull. ex Fr.; 2 - *semitu*; 3 - semitas; 4 - 46.

Xerocomus spadiceus (Fr.) Quel.; 3 - hongo de paderon; 4 - 12.

Gasteromycetes

Lycoperdales

Calvatia cyathiformis (Bosc.) Morgan; 2 - *patarata*; 4 - 118.



Caballero Nieto, Javier and Mapes, S. 1985. "Gathering and subsistence patterns among the P'urhepecha Indians of Mexico." *Journal of ethnobiology* 5, 31–47.

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