HP2207

Ethnobotany of the Hopi

By

ALFRED F. WHITING

MUSEUM OF NORTHERN ARIZONA · FLAGSTAFF

Originally issued in 1939 as Bulletin No. 15

THIRD PRINTING

Copyright 1966 by the
NORTHERN ARIZONA SOCIETY OF SCIENCE & ART

Printed in the U.S.A. by Northland Press / Flagstaff, Arizona

HP2208

CONTENTS

PAGE

Foreword v
Acknowledgements vi
Phonetic Key vii

CHAPTER
I. Ethnobotany 1
Relationship of Ethnobotany to Botany and Anthropology 1
Problems Involving Ethnobotanical Data 1
The Presentation and Interpretation of Ethnobotanical Data 2
II. The Hopi and His Environment 4
The Hopi 4
The Flora 5
The Hopi Attitude Towards Nature 6
III. Agriculture 8
History 8
Hopi Crops 11
Agricultural Methods 13
The Preparation of Corn Dishes 15
The Cultivation of Wild Plants 16
IV. Wild Plants Used for Food 18
Staple Foods 18
Spring Greens 18
Seasoning 19
Beverages 20
Between Meals 20
When the Crops Fail 20
V. Construction, Implements and Decoration 22
Construction 22
Firemaking and Firewood 22
Implements of Hunting and War 23
Musical Instruments 24
Household Utensils 25
Arts and Crafts 26
Personal Decoration 28
VI. Hopi Medicinal Plants 30
The Medical Profession 30
Hopi Medicinal Herbs 31
VII. Plants of Ceremonial and Magical Importance 38
The Kiva 38
Kachinas 38
Ceremonial Emetics 39

and were attempting to proselyte the Hopi (Bartlett, 1936). In 1875, a mission was established near the Hopi village of Moenkopi and was enlarged a few years later to form Tuba City, which they occupied until it was purchased by the Government in 1903 (Colton, 1931). During this quarter of a century the Hopi were exposed to many new farming methods as well as to new crops. The name *momonvatnga* (Mormon pumpkin) indicates that the turban squash first appeared during this period. Sorghum and the safflower and probably many other plants also date from this period of Mormon influence. The Hopi of Moenkopi, the only ones to come into intimate contact with the Mormons, are the only large group of Hopi today who practice extensive irrigation and probably show more influence from this source than those groups with which this study is primarily concerned.

Toward the turn of the century, school teachers, traders, missionaries and visiting ethnologists found the Hopi willing recipients of seed.

At the San Diego Exposition in 1915, representatives of several Indian tribes were brought together for exhibition purposes. Here the Hopi met other agricultural peoples and varieties of corn were exchanged. Since then, the Hopi farmers have learned to buy from mail order houses and nurseries.

When it comes to seed, the Hopi will try anything once.[2] The results are often failures and are sometimes ludicrous. One recalls particularly the old man who planted cauliflower seeds and complained of the results being "like a cabbage, only all white on the inside, but we don't know how to eat it!"

Thus, though the Hopi farmer of today comes from a long line of agricultural stock, only a few of his crops are ancient. Wool has displaced cotton and most of the ancient food plants have been discarded in favor of other varieties which are easier to grow, yield better, are better flavored, or more easily prepared.

Today a good farmer may raise five distinct types of corn and as many varieties of beans, each with its own name and special uses. He will plant squash, pumpkins, watermelons, and muskmelons, while his wife tends the tiny irrigated plots of chili and onions, cabbages and possibly tomatoes or other vegetables. Most certainly he will have peach trees and at least some apple and apricot trees. Some farmers are raising cherries, pears, and grapes. Not infrequently sunflowers and other dye

[2] The details of how new seed is acquired and exchanged have been described elsewhere. (Whiting, 1937)

plants can be found in a corner of the gardens. And here and there a Hopi farmer, who can afford the time and space, may be experimenting with potatoes or peanuts. One old gentleman even went so far as to raise a wild mint in his garden.

HOPI CROPS

Considering the intense interest of the Hopi in new varieties of crop plants and their numerous introductions and experiments it is surprising that Hopi agriculture is as stable as it is. Stephen, writing in his journal in 1893, mentions essentially the same crops which Whiting and Jones found among these people some forty years later. Cotton had disappeared, there were a few more fruit trees, some new beans and vegetables, but the common types of corn remained essentially the same. This stability is due, in part, to the fact that new crops are often abandoned almost as quickly as they are introduced. For example, an Oraibi farmer, employing the ordinary dry farming technique, recently raised a successful crop of Illinois field corn (yellow dent) but did not replant it a second year.

However, the numerous experiments with new varieties and the changing economic conditions have not been without some effect. It would appear, for example, that the harder varieties of corn are being replaced by similar but softer varieties that are easier to grind. The chief advantage of the harder varieties, including the now rapidly disappearing flint corn, is that they are not so easily attacked by corn weevils in the storage bins. This is a distinct advantage only when it is felt necessary to keep an extra year's supply on hand against a possible famine. With the improvement of the roads and the greater amount of cash income, the fear of famine is decreasing and consequently these types of hard corn are being discontinued.

The Hopi have no knowledge of cross-pollination. They do not plant seed that it may grow into a plant, but rather as an indication to the germ god, who lives in the ground, where and what kind of corn is desired. They are supposed to notify the germ god in advance where they are going to plant their different types of corn. Occasionally a farmer changes his mind just before planting or confuses the boundaries of his fields. The germ god, who has already prepared the fully matured crop according to previous instructions, is now confused. Although he tries to rectify his mistake, even his best efforts often result in a mixture. Since the same types of corn are usually planted year after year in the same fields, this theory satisfactorily ex-

HP2209

plains the results of cross-pollination which takes place along the borders of adjacent fields.

Although the Hopi do not understand the real reason for these mixtures they refuse to plant any kernels from an ear of corn which they consider to be a mixture, thus maintaining their varieties in a more or less pure state. They are also keen to note differences in the quality, season, or other desirable characters, and seed corn is often selected with these factors in mind. These varieties are virtually hereditary within the household and great care is taken that no viable seed should leave the house except for a ceremonial blessing in the kiva or to be planted in the fields.[3]

Plants Cultivated by the Hopi

Plants cultivated since prehistoric times:

Corn	*Zea mays*	Page 67
Squash	*Cucurbita moschata*	" 93
Bean (kidney)	*Phaseolus vulgaris*	" 82
Tepary	*Phaseolus acutifolius latifolius*	" 80
*Cotton	*Gossypium hopi*	" 84

Plants of doubtful origin, possibly introduced in Pre-Spanish times:

Sunflower	*Helianthus* sp.	Page 97
Gourd	*Lagenaria vulgaris*	" 93
Lima bean	*Phaseolus lunatus*	" 81
Aztec bean	*Phaseolus multiflorus*	" 81

Plants introduced after the coming of the Spanish:

†Onion	*Allium cepa*	Page 70
†Chili peppers	*Capsicum annuum*	" 88
Watermelon	*Citrullus vulgaris*	" 92
Peaches	*Prunus persica*	" 79
‡Wheat	*Triticum sativum*	" 66

Plants introduced by the Mormons:

†Safflower	*Carthamus tinctorius*	Page 95
Turban squash	*Cucurbita maxima*	" 93
‡Sorghum	*Sorghum vulgare*	" 66

Probably other fruits and vegetables.

Plants of recent introduction:

†Coxcomb	*Amaranthus cruentus*	Page 74
†Peanut	*Arachis hypogaea*	" 79
†Beet	*Beta vulgaris*	" 73

[3] For a further discussion of Hopi agriculture see C. Daryl Forde, 1931; Whiting, 1936, 1937; Titiev, 1938.

†Cauliflower	*Brassica oleracea botrytis*	Page 76
†Cabbage	*Brassica oleracea capitata*	" 76
†Turnip	*Brassica rapa*	" 76
†Coriander	*Coriandrum sativum*	" 86
Melon	*Cucumis melo*	" 93
†Cucumber	*Cucumis sativus*	" 93
†Carrot	*Daucus carota*	" 86
*†Fennel	*Foeniculum officinale*	" 86
Jerusalem artichoke	*Helianthus tuberosus*	" 97
†Lettuce	*Lactuca sativa*	" 97
†Tomato	*Lycopersicum esculentum vulgare*	" 89
†Pea	*Pisum sativum*	" 83
†Radish	*Raphanus sativus*	" 77
Potato	*Solanum tuberosum*	" 90

Fruits:

Apple	*Malus sylvestris*	Page 79
Almond	*Prunus amygdalus*	" 79
Apricot	*Prunus armeniaca*	" 79
Cherry	*Prunus* sp.	" 79
Pear	*Pyrus communis*	" 79
Grape	*Vitis* sp.	" 84

* No longer grown.
† Cultivated in small, hand irrigated plots near springs.
‡ Cultivated only under irrigation at Moenkopi.

AGRICULTURAL METHODS[4]

The main corn crop is raised along the bottoms of the washes where flood waters provide a risky substitute for irrigation. Some corn fields are also planted under the cliffs along the edges of the valleys where underground seepage provides the necessary moisture in favorable years. The Hopi farmer thus has two chances of outwitting the weather. If the rains wash out the first crop he can fall back on the second, and when this fails in a dry year there is often enough flood water to insure a harvest from the first. At best, however, the harvest is insecure and the orthodox Hopi household maintains an extra year's supply of corn to provide against the inevitable year of complete failure.

Beans, in contrast to corn, are usually planted in separate fields on top of the mesas, though occasionally they may be planted in separate rows in the same field with the corn. Squash, melons, gourds, etc., are grown in small plots in favorable localities close to the villages or in a corner of the corn or bean fields. Peaches and other fruit trees huddle in

[4] The following is a general description to which there are occasional exceptions.

HP2210

gangling, unpruned orchards in the sand dunes under the rocky cliffs.

In addition to assisting the men in the fields, the women have sole charge of the tiny garden plots which they, or occasionally some luckless man, irrigate by hand from a pool near one of the springs. Here are raised chili and onions as well as a wide variety of garden vegetables.

Some anthropologists would classify all American Indian agriculture as "horticulture" in as much as it does not involve the plow. It should be noted that in Hopi agriculture there is a sharp distinction between the irrigated gardens, which are unquestionably horticulture, and the extensive fields of corn which might well be classed as agriculture, in the more limited sense.[5]

Hough has given us a good brief description of the field methods as he saw them forty years ago. As the picture is not materially different today the following description is adapted from his account (Hough, 1918, p. 236–237).

Usually the corn fields are located in shallow sand dunes. These are cleared of brush in February. Planting begins in April and the harvest commences in September. Spring frosts and sand storms are drawbacks to the success of the crops, and sometimes floods injure the low-lying fields. The tools used are a planting stick usually made of ironwood or oak, usually with a wedge point, but sometimes having a blade. A hole is dug a foot or more deep and from 6 to 12 or more grains placed therein. These holes are gradually filled in as the plants develop. The hills are about 6 feet apart. The plant is small and rarely 5 feet high, the ears shooting near the ground.

The field is kept clear of weeds by means of hoes, usually the heavy homemade blade of Spanish pattern, sometimes of wood and anciently, according to tradition, of stone. The wooden trowel for tending plants appears to be a survival.

In the cornfields, scarecrows consisting of sheep scapulae, tin cans, etc., are set up.

For cleaning brush from the fields, a curious rake-fork is used. It consists of a three-tined branch of a juniper tree, peeled, and across the tines lashed a strengthening rod of wood.

[5] "Horticulture . . . From agriculture it has no definite boundary. It is in fact, a department of agriculture, as forestry is; for agriculture, in its largest meaning, is the business of raising products from the land. It is customary, however, to limit the word agriculture to the growing of grains, forage, breadstuff, textiles, and the like and to the raising of animals. In this restricted application it is practically coordinate, in a classificatory sense, with forestry and horticulture." L. H. Bailey, 1935, Vol. IV, Page 1501.

Corn is gathered by removing the ears and transporting them to the pueblo in wicker carrying baskets on the back or in blankets over the back or on the burro. Much of it is used in the green state during the roasting ear season. Husking pegs of bone or wood have been observed among the Hopi, but it is not known that this implement is ancient. The husked ears of corn are stored in the house in a place reserved for the purpose. Sorted by colors, it is stacked like cord wood. Occasionally it is taken out, sunned and brushed to free it from dust and insects. It is stored by crops, one year's being held over in case of failure due to a bad season. This custom is said to have arisen on account of famines, which have so often plagued the Hopi in former years.

THE PREPARATION OF CORN DISHES

Corn is stored on the cob and shelled as needed. There are almost innumerable ways of preparing it. Hominy is made from white corn by soaking the kernels in moist juniper ashes. The corn is then boiled and the ash and hulls washed off. When kernels that have been soaked in salt water are parched in hot sand, the outer coat splits and yields a product much like pop corn.

One of the chief duties of women is the grinding of corn on stone slabs. The resulting meal is used in many ways. Perhaps the best known of the numerous Hopi corn foods is the *piki* or wafer bread. It is cooked on a thin stone slab which has been carefully oiled with the fruits of *Reverchonia arenaria*, or more often, the ground seeds of squash or watermelon. A fire is built under this stone and when it is hot the surface is covered with several handfuls of a thin gruel of blue corn meal. To prevent the blue coloring matter in this meal from turning red, an alkali is added, usually the ashes of the salt bush, bean vines, or occasionally of *Parryella filifolia*. It is said that baking powder can be used if none of these are available. This mixture, which cooks quickly, separates from the stone and can be peeled off as a large blue-gray sheet of paper-like thinness. This is then folded like a small newspaper into a roll or "stick." On special occasions *piki* is made of sweet corn, or white corn meal colored red with coxcomb or possibly bright yellow with the false saffron (safflower). The story is told of one woman who attempted to use aniline dyes to color her *piki*. Fortunately for the health of her household, the results, although bright and colorful, were too bitter to be eaten.

Corn dumplings are boiled in a pot with split twigs of juniper to keep them apart.

HP2211

Sweet corn is baked in large pit ovens in the field and although a large feast follows the opening of the pit a considerable supply is left over. The short stems, which have been left at the base of the ear, are pierced and the ears strung on strands of yucca. It is then dried in the sun and stored for winter use. (Hopi corn is never hung by braiding the husks in the New England fashion.)

(For extensive data on the preparation of corn dishes among the Zuñi see Cushing, 1920.)

Wild plants used in agriculture and food preparation

Saltbush	*Atriplex canescens*	Page 73
Ironwood	*Forestiera neomexicana*	" 87
Juniper	*Juniperus utahensis*	" 62
	Parryella filifolia	" 80
Oak	*Quercus* spp.	" 72
	Reverchonia arenaria	" 84
Yucca	*Yucca angustissima*	" 71

THE CULTIVATION OF WILD PLANTS

There is a further aspect of Hopi agriculture which is of considerable theoretical interest: the cultivation of wild plants. We have already mentioned the old gentleman of Lower Oraibi who raised a wild mint (beebalm) in his garden from seeds obtained from wild plants.

Wild tobacco is scarce in the Hopi country and it is said that occasionally a man may scatter seeds on some convenient and favorable spot, thus insuring himself a goodly supply of this plant for ceremonial purposes.

The root of a wild dock used in dyeing which is now comparatively hard to obtain in the vicinity of the Hopi towns is occasionally grown in small, unirrigated plots along the foot of the Oraibi mesa.

It is a general practice to allow certain weeds to grow unmolested in the otherwise carefully hoed Hopi fields. While strictly speaking this cannot be called agriculture, it is interesting to note that essentially the same method is used to propagate the coxcomb (*Amaranthus cruentus*). This introduced plant is allowed to seed itself from year to year in the irrigated gardens. Similarly, plants of the Rocky Mountain beeweed are allowed to mature and to disperse their seed in Hopi corn fields providing an abundant supply of young plants for the cook pot the following spring. The little wild potato often yields an abundant harvest under similar treatment. The devil's claw, or unicorn plant, is also left growing in the fields, partially because

the long spiny fruits are supposed to attract lightning and thus the rain, and partially, one suspects, because they are in considerable demand in the construction of ceremonial paraphernalia.

There are a number of wild plants with which the Hopi concern themselves beyond mere exploitation. Cottonwood and willows are sometimes transplanted into the neighboring washes, and there is a patch of cattail growing in the Oraibi Wash which has been introduced from near Tuba City.

While this type of embryonic agriculture has probably been in existence for a long time it has not contributed significantly to the Hopi crops and as a factor in the native economy it is relatively unimportant.

Semi-cultivated wild plants

Beeweed	*Cleome serrulata*	Page 77
Devil's claw	*Martynia louisiana*	" 92
Beebalm	*Monarda menthaefolia*	" 91
Wild tobacco	*Nicotiana attenuata*	" 90
Wild tobacco	*Nicotiana trigonophylla*	" 90
Cottonwood	*Populus* spp.	" 71
Wild dock (Canaigre)	*Rumex hymenosepalus*	" 73
Willow	*Salix* spp.	" 71
Wild potato	*Solanum jamesii*	" 90
Cattail	*Typha angustifolia*	" 64

HP2212

Listed by Hough (1898) under the Hopi name which refers to any grass growing near water. *Panicum autumnale* Bosc. is also listed in some publications.

Panicum obtusum H. B. K. VINE MESQUITE GRASS
Though listed by Hough (1898) it was not found. The name he lists is apparently a confusion with *wu:'si* (*Muhlenbergia pungens*).

Phragmites communis Trin. REED, CARRIZO *pa:'kavi*
Phragmites phragmites (L.) Karst.
A native reed growing in the vicinity of springs.
USE: Roofing, tubular pipes, pipe stems, weaving rods. Hough (1918, p. 295) mentions a reed flute. Prayer-sticks. Name of a clan of the Sun-Eagle phratry. The creation myth tells how the ancestors of the Hopi climbed from the underworld through the reed. Ceremonially the reed is associated with the bow and arrow. However the use of the reed-shafted arrow among these people in recent times appears doubtful (Voth, 1905a, p. 76; Hough, 1918, p. 288).
NAME: The modern village of Bakavi is located at a spring which is named for this plant.

Polypogon lutosus (Poir.) Hitchc. BEARD GRASS
Polypogon littoralis J. E. Smith
A rare introduced species. The name listed by Hough is applied to *Sitanion hystrix*.

Sitanion hystrix (Nutt.) J. G. Smith SQUIRREL TAIL *pe'sru*
A common grass with a bushy spike.
NAME: For the tail of the rat (*s3'r3*, tail).

***Sorghum vulgare** Pers. SORGHUM *mola's'u:'yi*
Andropogon sorghum Brot.
Introduced by the Mormons. Grown under irrigation at Moenkopi.
USE: A source of sweet syrup.
NAME: *mola's*, molasses: *'u:'yi*, plant.

Sporobolus airoides Torr. ALKALI SACATON *n3:'n3*
A bunch grass very abundant on the desert.
USE: The grain, which falls free from the chaff when ripe, was collected in quantity for food, particularly in times of famine. Occasionally used today.

Sporobolus contractus Hitchc. DROPSEED *moki'okwa:'kwi*
Smaller than *S. giganteus*.

Sporobolus flexuosus (Thurb.) Rydb. DROPSEED *l3ha'vu*
Resembles *S. airoides* and often confused with it by the Hopi. Less common.
USE: Similar to *S. airoides*.
NAME: *l3ha'vu*, testicles.

Sporobolus giganteus Nash GIANT DROPSEED *kwa:'kwi*
A tall grass with a long spike. Conspicuous about the base of the mesas.
USE: Easily harvested food grain whose use has almost disappeared. Stem used in making *paho* (prayer stick) during Soyal Ceremony (Dorsey & Voth, 1901, p. 20).

Stipa comata Trin. & Rupr. NEEDLE-AND-THREAD GRASS *ho:'ki*
Name also applied to several other grasses.

***Triticum sativum** Lam. WHEAT *s3h3'vosi*
Introduced during Spanish times at Awatobi (Brew, 1937) and probably

elsewhere. Later abandoned, probably because of lack of sufficient moisture. It is now grown at Moenkopi under irrigation.
NAME: *s3h3*, grass; *-vosi*, seed.

***Zea mays** L. CORN *qa''3*
There are innumerable ways of preparing corn for food. The grains may be parched. Soaked in water with juniper ash, boiled and washed they make hominy. Though the coarse stone metate or grinding stone is now supplemented by coffee grinders, fine corn meal is still ground by the women in the traditional manner and forms an important ingredient in many Hopi foods. One of the best known being *piki* or wafer bread.
Corn appears in virtually every Hopi ceremony either as corn meal, as an actual ear of corn or as a symbolic painting. Fewkes (1901, p. 214) writes:

> Corn is mother in the sense of furnishing sustenance to people who rely upon it for food, and is so highly prized that its seed was committed to the care of the chief of the clan. Every Hopi child has an earn of corn as its special symbolic "mother," every youth initiated into a religious fraternity has a like symbol of his food mother. Each novice at initiation places his special ear of corn on the altar at the time of his introduction into the society; . . . the ear of corn with accompanying trappings owned by the chief of the clan is . . . called *tiponi*.

In the Water-Corn phratry there are a number of "Corn" clans.
Hopi corn is characteristically short, rarely exceeding 5 feet in height, except under irrigation. Ears are few on each stalk and vary considerably in size in different varieties. For a further discussion of corn, see Chapter III.
The following discussion of the varieties of Hopi corn is based on material collected by Jones and Whiting in 1935.

***Zea mays amylacea** Sturt. FLOUR CORN *qa''3*
White corn *q3tca'qa''3*
This is the most abundant type of Hopi corn; is raised by every farmer. Planted in late May or June and harvested in October. Ground into corn meal, made into hominy and numerous other dishes, it constitutes the main food supply. Ceremonially it is associated with the northeast direction.
NAME: *q3tca*, white; *qa''3*, corn.
VARIETIES: There are numerous strains, varying considerably in size. Frequently shows considerable admixture of red. The varieties grown at Moenkopi under irrigation are considerably larger.
Large white corn. (*wuko'*, large.) *wuko'q3tca'qa'3*
Eastern white corn. *hopa'kq3tca'qa''3*
Imported from the Rio Grande area following the famine of 1863. (*ho'pak*, refers to northeast direction.)
Havasupai white corn *q3tca'ko'ninqa''3*
A white variety with a red cob grown on Second Mesa. Obtained from the Havasupai (*ko'nino*) at the San Diego exposition in 1915.
Third Mesa white corn. *q3tca''a'vatca*
Blue corn *sakwa'fqa''3*
Next to white corn, blue corn is the most important Hopi crop. Every family raises at least one type of blue corn in quantity.
USE: Used to make the familiar blue piki or wafer bread. The blue coloring in the corn, when treated with an alkali, causes the resulting product to be a deep blue-green. The alkali used is normally the ashes of the sage, *Atriplex canescens*, although occasionally the ashes of other shrubs may be used, and in an emergency, baking powder. The pink and yellow *piki* bread is usually made

HP2213

from white corn meal using vegetable dyes (See *Amaranthus cruentus* page 74 and *Carthamus tinctorius* page 95.)

VARIETIES:

Hard blue corn *huru'skwapu*

A blue-black flour corn with a thin flinty outside coating. A strain of this variety was obtained from the Havasupai at San Diego in 1915. This was said to have come from the Hopi originally. Another strain known as *ho'pakhuru's-kwapu* is said to have come from Santo Domingo. (*ho'pak*, refers to the north-east direction.)

Soft blue corn *sakwa'pu*

A true flour corn, dark blue in color. Ceremonially associated with the south-west direction.

Gray-blue corn *masi'qa'*$_3$ *masi'skwapu*

Two other varieties separated from *sakwa'pu* by their color. This distinction is largely fictional. There is considerable variation in size and shape, as well as in color.

Flying eagle corn *kwa:'qa'*$_3$

A variety with white kernels tipped with dark blue, a type sometimes known as "Navajo Sacred Corn" (Weatherwax, 1923). It is soft and easily ground. It is said to grow faster than other varieties and can thus be planted later. Obtained from the Havasupai at the San Diego exposition in 1915. Grown by a few families on Second Mesa. (*kwa'h*$_3$, eagle, hawk).

Speckled corn or **Owl corn** *'avatcqa"*$_3$ *hoto'k'a'vatca* *hoto'kqa"*$_3$

A mixture between blue and white corn. Raised occasionally as a staple crop. (*ava'tca*, speckled, spotted, or variegated.)

Eastern speckled corn *nene'ngefqa"*$_3$

A similar cross imported from the Rio Grande region following a famine.

Red corn *pala'qa"*$_3$

Not often raised as a pure strain but occurs commonly in fields planted with white corn.

USE: Food, in the same manner as white corn. Associated ceremonially with southwest direction. "A red ear of corn is allowed to remain in the place where the person died, for four days, when it is stuck in the ceiling immediately over the place where it had been lying. If it is still there next planting season, he who has the bravest heart takes it out and plants it." (Stephen 1936, page 828.)

VARIETIES:

Pink corn *pala'tspipi*

A mixture of red and white corn. Sometimes known as *pala'tskaqa"*$_3$, or *honya"a'vatca*.

USE: Boiled and added to white clay to make a body paint for kachinas.

Havasupi chin mark corn *ko'ninqa"*$_3$

The familiar "squaw corn" of commerce. The red markings on a light background remind the Hopi of the marks the Havasupai paint on their chins.

NAME: *ko'nino*, Havasupai.

Purple corn *koko'ma*

Often referred to in the literature as "black," this corn actually is a deep purple. The genetic factors producing this color include those which produce red.

USE: This variety is not popular as food since it stains the mouth. When the cob is also purple it can be used as a dye for basketry and textiles. A purplish red body paint used in some of the kachina dances is made by adding a white clay to a mixture of boiled purple corn with the sumac berries (See *Rhus*, page 84). Ceremonially it is associated with the zenith, although the ceremonial color of the zenith is black.

VARIETIES:

Havasupai purple corn

A strain of this corn raised by families on Second Mesa was obtained from the Havasupai in 1915. The Havasupai are supposed to have obtained it from the Hopi in former times. Whether this is history or an attempt to maintain Hopi superiority could not be determined.

"Dented" purple corn *hona'fsi*

Some Hopi differentiate a deep purple corn with dented kernels. It is a true flour corn with no flinty endosperm.

Yellow corn

A short season variety. *taku'ri*

USE: Grown chiefly as a source of early green corn. Used for mush because it "tastes stronger than other varieties." Ceremonially it is associated with the northwest direction.

NAME: Also *siky'ngpu* (*sikya*, yellow). *taku'sqa"*$_3$.

Violet or **Orchid corn** *wie'qtu*

An early variety used like yellow corn.

NAME: "Greasy head corn" (Jim), "greasy looking corn." *wi'hu*, grease. (See *Phaseolus vulgaris*, *wi'mori*, page 82.)

Kachina corn *katci'nqa"*$_3$

Mixtures of seed are often distributed during kachina ceremonies in early spring. A lot of corn from the planting of such seed is highly colored. Since the Hopi use only ears of uniform color as seed, most of this crop is not suitable for planting and is usually eaten before it matures.

***Zea mays saccharata** Sturt. SWEET CORN *tawa'ktci*

Sweet corn is grown in small quantities by practically every family. Stephen describes the early planting of sweet corn:

> They . . . "then shelled a quantity of sweet corn, taking precautions that no children should see what they were doing. Ha'yi then distributes these kernels privily to some of the men of each of the three villages, telling them . . . that it should be planted tomorrow. It is not planted in the open fields, but in warm nooks where the children may not see it growing, as it is not displayed in public until *Nima'n* kachina. Its planting and cultivation are kept secret from the children." (Stephen, 1936, p. 373.)

Other fields may be planted to sweet corn later in the season. Early varieties of flour corn as well are sometimes ready at the *Niman* kachina.

USE: In September all but the seed ears are baked in large earthen pits. A large quantity is eaten immediately, and the remainder husked, strung on strips of yucca leaf, and dried in the sun. These ears are used throughout the winter as a source of sweetening, and are made into various special dishes. Whole ears are boiled and given as presents by the kachina during the winter ceremonies. (Stephen, 1936.)

Ceremonially it is associated with the nadir.

NAME: The meaning is obscure. It is not related to the Hopi words *katcina*, kachina, or *ta'wa*, sun.

HP2214

VARIETIES: Many of the strains are small eared. Usually sweet corn is light-colored, although variously colored and mixed strains are occasionally seen. Commercial Golden Bantam is often raised.

A small variety raised on Second Mesa. *honya'tawa'ktci*

Red sweet corn *pala'tawa'ktci*

***Zea mays indurata** Sturt. FLINT CORN

Once a popular type of corn. With changing economic conditions it has now practically disappeared. (See page 11.)

CYPERACEAE and JUNCACEAE Sedges and Rushes

Scirpus lacustris L. *mumu'ri*
Juncus balticus Willd.
Juncus torreyi Coville

The Hopi class together all grass-like plants growing near water, particularly those with round stems and leaves.

USE: Occasionally used in ceremonies, because of their association with water.

COMMELINACEAE

Tradescantia sp. SPIDERWORT *paso'mi*

Occurs occasionally in the Hopi country.

USE: Hough (1898) reports its use for greens. Not verified.

LILIACEAE Lily Family

***Allium cepa** L. CULTIVATED ONION *si:'wi*

Onions are commonly raised in the small, irrigated gardens from sets obtained from stores in towns near the railroad.

NAME: *sio'u'yi* (*'u'yi*, plant, to plant) to distinguish it from the wild onion.

Allium cernuum Roth. ONION *si:'wi*
Allium recurvatum Rydb.
Allium geyeri S. Wats.
Allium deserticola (Jones) Woot. & Standl.

Small wild onions common in the Hopi country.

USE: Much utilized for flavoring before the introduction of the cultivated onion.

Calochortus aureus S. Wats. MARIPOSA LILY *he:'si*

A bright yellow flower common near the villages in the spring.

USE: Root eaten raw (Hough, 1898). Important ceremonially as the Yellow flower associated with the Northwest direction. In the spring it is collected in quantity together with *tcoro'si*, larkspur (*Delphinium scaposum*, see page 76). Boys holding handfuls of these two plants above their heads are chased by the girls upon certain occasions. Artificial reproductions made of yellow paper and green yarn are used in the *Powa'mu* ceremonies (Stephen, 1936, p. 248). The seeds and flowers are ground to make "Yellow Pollen" (Stephen, 1936, p. 1216). Name of a clan of the Snake-Lizard phratry.

Nolina sp. BEAR GRASS *sili'omo'hu*

This valuable fiber plant is not found in the Hopi country, though it occurs farther south. Descriptions of a "long leaved yucca" apparently refer to this genus.

Yucca angustissima Engelm. NARROW-LEAVED YUCCA *mo'hu*

Often listed as *Yucca augustifolia* Pursh or *Yucca glauca* Nutt.

The common yucca in the Hopi country, now relatively scarce in the immediate vicinity of the villages.

USE: Roots are crushed with stones and used for soap. In the ceremonial washing of the hair as a purification rite the suds are associated with clouds. Used medicinally as a strong laxative. The leaves are extensively used in many types of basketry, being collected for this purpose in large quantities. The juice is used as a "varnish" on certain sacred kachinas. Also for incidental materials, paint brushes, as whips in ceremonies, etc. "The Agave Clan is said to own the yucca plant" Voth, 1905a, p. 93). "To cure baldness, which is very rare, wash the hair with yucca root and rub with duck grease, because ducks have such heavy feathers" (Edmund). See *Clematis*, page 76; *Fallugia*, page 78.

NAME: *mo'hu* refers to the top of the plant, while *mo:vi* refers to the roots.

Yucca baccata Torr. BROAD-LEAVED YUCCA *samo'a*

In the canyons and on mountain slopes south of the Hopi country.

USE: The large fruits were baked in earth ovens. The leaves are occasionally used in basketry, and the roots for soap. The commoner species, *Y. angustissima* is more generally used.

NAME: *samo'a* refers to the top of the plant, while *sa:'hu* refers to the roots.

AMARYLLIDACEAE

Agave sp. CENTURY PLANT, MESCAL *kwa:'ni*

This plant reaches the Hopi through trade with the Havasupi of the Grand Canyon.

USE: The Havasupai pile stones on the young buds, forcing them to grow into deformed balls. These, as well as the leaves, are baked in large earth ovens and form an important article for the trade with the Hopi. When soaked in water this preparation yields a drink. The stalk is said to have been used as a lance shaft in ancient times.[11] The stalk is placed on top of the Agave clan kiva in November to indicate that the imitiation into the one-horned, or Agave society is in progress. Both the stalk and the fiber are used in preparation of ceremonial equipment. The root is part of the fire-making apparatus (Stephen, 1936, p. 1280). The Agave society is associated with the nadir (Stephen, 1936, p. 1081). Name of a clan of the Fire-Coyote phratry.

SALICACEAE Willow Family

Populus aurea Tidestrom ROCKY MOUNTAIN ASPEN *tʒvo'vi*
Populus tremuloides aurea Daniels

On the mountains and in canyons at higher altitudes.

USE: Associated with the northeast direction (Stephen, 1936, p. 668). Ritually smoked.

Populus spp. COTTONWOOD *sʒhʒ'vi*

Cottonwoods grow along washes and near springs, often being transplanted by the Hopi. The demand for cottonwood root is so great that trips of some distance are made to obtain it.

USE: The trunks are sometimes used as beams in construction of houses; the roots are carved into kachina dolls for the children (and more recently for the tourist), into gaming cups and into boxes for sacred feathers and various cere-

[11] This problem needs further investigation.

HP2215

lowing spring. In the manufacture of *paho* (prayer-sticks) in *Powamu* ceremony (Voth, 1901, p. 78). This plant is used in the preparation of pottery paint among the Tewa of the Rio Grande (Robbins, et al., 1916, p. 59), (see *Sophia*, p. 77). At Hano it is named with the three chief cultivated plants—corn, pumpkin, cotton. (Robbins, et al., 1916.)

Wislizenia melilotoides Greene *sikya'tumi*
A small plant with yellow flowers, resembling the beeweed (*Cleome*). Seen near the reservation at Tuba City and near Leupp.
USE: Same as *Cleome serrulata*.
NAME: *sikya'*, yellow; *tu'mi*, *C. serrulata*.

GROSSULARIACEAE Gooseberry Family

Ribes inebrians Lindl. WILD CURRANT *yowi'fsi*
Wild currant bushes grow occasionally on the Hopi mesas.
USE: The berries are eaten, though they "make you ill" (Don). Wood for arrows.

ROSACEAE Rose Family

Cercocarpus eximius (C. K. Schneid.) Rydb.
MOUNTAIN MAHOGANY *putci'vi*
Large shrub growing in higher altitudes at some distance from the reservation.
USE: Bark used in dying leather (see *Betula*, p. 72). Wood made into batons and combs used in weaving (Hough, 1918).

Cowania stansburiana Torr. CLIFF ROSE *hu:'nvi*
Shrub with white flowers and characteristic five tailed fruits grows commonly on the Hopi mesas.
USE: Arrows. In the old days the cradle board was padded with the bark from the larger stems (sometimes mistaken for juniper bark). It is also used medicinally as an emetic and a wash for wounds. Associated with the southeast direction on the *Powamu* altar (Voth, 1901, p. 76).
The bark is said to have been spun and woven into the kilts worn by the snake priests.
A plant similar to *hu:'nvi*, *pisa'hunvi*, which unfortunately could not be located, is described as a smaller shrub, a foot to a foot and a half high, growing on the sand at the foot of the mesas.

Fallugia paradoxa (Don) Endl. APACHE-PLUME *mo:'povi*
A smaller shrub than the cliff rose with numerous tailed fruits. Occasional on the mesas.
USE: Stems are used for arrows. Hough (1898) lists this plant with the name *hu:'nvi* (see *Cowania stansburiana*, above), stating that it was used for a hair-tonic. This could not be verified. Ceremonial equipment (Stephen, 1936).
NAME: Arrow plant.

Rosa arizonica Rydb. WILD ROSE *te'skona* (2)
tu'skona (3)
Wild roses grow in Keam's Canyon.
USE: Children occasionally eat the fruits.

MALACEAE Apple Family

Amelanchier pallida Greene SHADBLOW *tuwa'vi*
In higher altitudes and in canyons.
USE: Bows and arrows. Hough (1898) states that the berries are sought as food. Probably more sought than eaten, as the trees are scarce in the Hopi country. "Never used as food" (Edmund).

***Malus sylvestris** Mill. APPLE *mansa'na*
Pyrus malus L.
Frequently cultivated.
USE: Food.
NAME: From the Spanish, *manzana* (apple).

***Pyrus communis** L. PEAR *homi''sipa'la*
Occasionally cultivated.
USE: Food.
NAME: "Peach with a handle on it." Sometimes *homi'takamansa'na*, "apple with a handle."

AMYGDALACEAE Plum Family

***Prunus amygdalus** Stokes ALMOND *sipa'ltuva*
Rarely cultivated.
USE: Food.
NAME: "peach nuts" (*sipa'la*, peach).

***Prunus armeniaca** L. APRICOT *s3h3'fsipa'la*
Commonly cultivated.
USE: Food.
NAME: Peach with leaves like a cottonwood. *s3h3f*, cottonwood; *sipa'la*, peach.

***Prunus persica** Sieb. & Zucc. PEACH *sipa'la*
Widely cultivated from Spanish times. As with many other fruit trees, nursery stock is not uncommon. The harvest is not dependable, often being destroyed by late spring frosts, hail and other causes.
USE: Peaches are greatly prized and form an important article of diet. They are eaten fresh or split open and dried for winter use. Recently canning has been introduced. The Owl and the Owl Kachina are said to have a special influence over the growth of peaches and all fruits. *Pahos* with owl feathers are made for them. Peach wood is especially prized as material from which to make weaving batons.
NAME: Refers to all fruits.

***Prunus** sp. CHERRY
Occasionally cultivated.

FABACEAE Pea Family

***Arachis hypogaea** L. PEANUTS
Rarely cultivated.

Astragalus ceramicus imperfectus Sheldon *pasi'fna*
Occasional near the Hopi villages.
USE: Children dig up and eat the sweet roots in the early spring.

Astragalus praelongus Sheldon *pato'to* (2)
pat3'qsasa (3)

HP2216

This and a number of other species of this genus with inflated pods are found on the sand dunes near the Hopi villages.

NAME: The inflated pods are popped by children, giving rise to the name.

Astragalus sp.? *momo'nga*

Listed in Stephen's Journal as one of the ingredients of the Snake Dance emetic. (Stephen, 1936, p. 711). See page 39.

Lupinus kingii S. Wats. DWARF LUPINE *po'snga*

Occurs occasionally on the reservation.

USE: This plant was not consistently recognized. Eye medicine (Don).

Oxytropis lambertii sericea Nutt. LOCO WEED *sita'ngwi*

Also listed as
Oxytropis lambertii Pursh
Spiesia lambertii (Pursh) Kuntze

The familiar blue-purple loco is occasional on the reservation.

USE: The Hopi recognize that it is poisonous to cattle.

Parosela terminalis (Jones) Heller *q3'snga*

Also listed as
Parosela lanata (Spreng.) Britton
Dalea lanata Spreng.

Occasional on the desert.

USE: The roots, it is said, are dug and eaten by the children during February. The plant was not generally recognized by my informants.

Parryella filifolia Torr. and Gray *koto'ks3'lvi* (2) *si'wi* (3)

Abundant shrub with fine leaves.

USE: Important basketry material used on Third Mesa. In the old days the curved roots were made into hooks useful in securing packs on burros, particularly on salt expeditions (Don). Hough (1898) reports the use of the ashes of this plant to color *piki* (see Blue Corn, page 67), and of the twigs as snow-brooms. Some kachina masks were woven of this material (Stephen, 1936). The beans are used for tooth ache (Don. Jones, 1932).

Petalostemon oligophyllum (Torr.) Rydb. *tawa''3svi*

Grows on the desert south of the Hopi towns.

USE: Generally recognized as a strong emetic.

NAME: *tawa*, sun; *'3'svi*, *Ephedra viridis*.

***Phaseolus acutifolius latifolius** Freeman TEPARY *tcatcai'mori*

The tepary is a small bean which grows wild in southern Arizona.

NAME: *tcatcai'-*, small; *mo'ri*, bean.

VARIETIES:

White tepary *q3tca'tcatcai'mori*

An old type which has been cultivated by the Hopi for a long time.

USE: The first salted dish eaten by a priest after a ritual fast is supposed to be of these beans. When these are not available other white beans are substituted. They are parched before cooking.

NAME: *q3tca'-*, white.

Black tepary *q3ma'ftcatcai'mori* (2) *seq3'mtcatcai'mori* (3)

A solid blue black bean with the surface veined and wrinkled. The brown eye ring is partially obscured by the blue black color.

NAME: *seq3m-*, dark (3); *q3ma'f-*, dark (2).

Mottled tepary

Light brown mottled with reddish-brown or reddish-purple. The eye ring is golden brown and partially obscured.

USE: Like the white tepary, it is parched before cooking.

***Phaseolus lunatus** L.[12] LIMA (SIEVA) BEAN *hati'qo*

Lima beans are planted in the kivas during the *Powamu* ceremonies in February. The relatively large size of the cotyledons in the sprouted plant make them preferable to other varieties. The success or failure of this kiva planting is thought to forshadow the success of the new year's crop.

VARIETIES:

White lima *q3tca'hati'qo*

A white lima of variable size.

NAME: *q3tca'-*, white.

Brown lima *masi'hati'qo*

Light brown to rich cream with blue mottling. Eye ring a distinct brown with an outer ring approaching an olive drab.

NAME: *masi'-*, gray, drab.

Yellow lima *sikya'hati'qo*

Yellow-brown with purple mottling. Eye white, saddle shaped. Resembles the commercial "calico" variety.

NAME: *sikya'-*, yellow.

Red lima *pala'hati'qo*

Red-purple often with purple mottling. Eye white, resembles "Jackson Wonder bush lima" in color, size and shape.

NAME: *pala'-*, red.

Black lima *q3ma'fhati'qo* (2) *seq3mhati'qo* (3)

NAME: *q3ma'f-*, dark (2); *seq3m-*, dark (3).

Phaseolus multiflorus Willd. SCARLET RUNNER BEAN *wuwu'imori*
Phaseolus coccineus

Occasionally raised by the Hopi. A large white, yellow, or purple bean of a type known commercially as the "Aztec bean." It is persistently rumored among whites and Indians alike that beans of this type have been grown from seeds found in ancient ruins. These reports seem doubtful and have never been verified. The bean is of tropical American origin and was cultivated by the Indians of that region in pre-Columbian times. There seems to be no authentic record of its occurrence in pre-historic temperate North America, although it might be reasonably expected to occur (Jones, correspondence 1938).

NAME: *wuwu'i-*, large; *mori'*, bean; *-vosi(posi)*, seed. Sometimes *q3tca'-wuwu'imori* (*q3tca-*, white); *sikya'wuwu'io* (*sikya'-*, yellow).

***Phaseolus vulgaris** L. STRING BEAN

The scientific nomenclature does not recognize the distinction between string beans and kidney beans.

String bean *pa:'pu* *ma:'wiongwu'*

The pods of these beans are edible and are preserved by drying. These are the only beans that are dried and stored in the pod, all others being thrashed at harvesting.

[12] The commercial "Hopi Lima" appears to have originated from a mixed collection of lima beans made by Mr. J. H. Kirkland on the Second Mesa in 1923 for Prof. W. W. Mackie of the University of California. It does not represent any aboriginal variety.

HP2217

VARIETIES:

Purple string bean *q3ma'fva'pu*

Light lavender color with very dark mottling. Eye ring purple, eye white.

USE: These beans are said to have an unusually fine flavor. They have been cultivated by the Hopi for a long time. The Hopi say that *Me'y'ingwa*, the spirit of germination, who sends up seeds, plants and fruits from the underworld, fashioned the bean by rolling it between his palms, the marks of which can be seen on the pods (Stephen, 1936). During the *Powamu* ceremony finely ground sweet corn meal is moistened and molded into the shape of this bean and colored with dye from the purple corn (*koko'ma*). These imitation bean pods are then attached to the beans sprouted in the kiva during these ceremonies (Edmund). (See Lima beans, above.)

NAME: *q3ma'f-*, dark; *-va'pu* (*pa'pu*) string beans.

Light string bean *q3tca'va'pu*

Cream colored, mottled with purple. The protruding eye ring is a rich cream in color. The ends are round to truncate. This variety has been introduced within the last twenty five years.

NAME: *q3tca'-*, white or light.

Red string bean *pala'va'pu*

A recent introduction. Similar to the commercial "Red kidney."

NAME: *pala'-*, red.

There are a number of people raising commercial varieties of string beans. These are usually planted in the irrigated gardens while the older Hopi types are grown in sandy fields on the mesas. There is no established terminology for these new beans.

***Phaseolus vulgaris** L. KIDNEY BEAN

The scientific nomenclature does not recognize the distinction between string beans and kidney beans.

Kidney bean *mori'vosi*

NAME: *mori*, bean; *-vosi* (*posi*), seed; *mori'vosi* is strictly applied to shelled beans. *mori'u:'yi* refers to a bean plant. (*'u:'yi*, plant). Specific varieties are named for color, use or other peculiarity. In such names the term *-mori* alone is used, *-mori'vosi* being considered cumbersome and unnecessary.

VARIETIES:

Blue dye bean *tupenmori*
kuwa'nmori

A solid blue-black bean with powdery bloom. An old type. Ends square to rounded. Size variable.

USE: To dye basketry materials a light blue.

NAME: *tupen-*, to dip it in (Jim).

Black bean *q3ma'fmori*

NAME: *q3ma'f-*, dark, black.

Yellow bean *sikya'mo'ri*

Deep straw colored bean, with white eye, ends rounded to truncate. "Asufrado" variety.

Probably not to be distinguished from the following.

Grease bean *wi'mori*

Several kinds of kidney beans are referred to by this term. They are various shades of yellow.

NAME: *wihu*, grease, greasy looking. Varieties are distinguished on the basis of their color as follows: *q3tca'wimori* (*q3tca'-*, light); *tasi'kwi'mori* (*tasi'k-* brown); *sikyawi'mori* (*sikya-*, yellow).

Red bean *pala'mori*

A red kidney bean of rare occurrence.

NAME: *pala'-*, red.

A pink bean resembling the commercial variety "Robust" in size and shape has been recently introduced. It is known as *pala'tskamo'ri* or *kap3''sanmori*. The latter name refers to the color of dried chewed pinon gum. It is said to have been introduced at the Government school at Keam's Canyon in 1895 (Jim).

More recently Mr. Hubbell, the trader at Oraibi, has introduced the Mexican pinto bean which is now generally known among the Hopi as Hubbell-*mori*.

In 1933 or 1934 what appears to be the Burpee strain of Dwarf Horticultural bean was obtained by one Hopi farmer indirectly from California through Indians in the Verde Valley. The 1935 crop was a success and the owner was planning to distribute the seed among the many people who were asking for it. There was no Hopi terminology at that time.

A pink and white, and a yellow and white pinto bean, known commercially as "Jacob's cattle," have recently made their appearance under the various names of *povo'khoimo'ri*, "puppy bean" (*povo'khoiya*, puppy) and *woka'smori*, "cow bean" (*waka'si*, cow (Spanish) *vaca*).

***Pisum sativum** L. PEA

Garden peas are sometimes planted successfully (Hough, 1918).

Robinia neomexicana A. Gray LOCUST

Introduced at Keam's Canyon and elsewhere. No Hopi name.

---

masi'ta'3ngwa

USE: Emetic to purify the stomach; also for rheumatism.

NAME: *masi'*, gray; *ta'3ngwa*, *Reverchonia arenaria*.

LINACEAE Flax Family

Linum australe Heller YELLOW FLAX

Occasional on the desert.

USE: Not generally recognized. Hough (1898) states that it was made into a tea for stomach disorders. Voth (1905, p. 51) states that it was known as "weasel medicine" and a decoction of this herb was used internally and externally in cases of protracted labor, because the "weasel, when in danger of being captured, rapidly digs its way through the ground and comes out at another place."

NAME: Various names given, including *sikya'mansi*, yellow flower; *piwä'nnga*, weasel medicine.

ZYGOPHYLLACEAE

Tribulus terrestris L. CALTROP *woka's'ala*
kuta''alat

A recently introduced weed with hard sharp-pointed fruits. Said to have been introduced near the Bakavi day school in the hay, and to have spread from there (Don).

NAME: The terminology has not become definitely established. *woka's'ala* and *kuta''ala* refers to cows' horns. *paka'pmo'snga* involving the Hopi name for woman's uterus, refers to the shape of the fruit.

EUPHORBIACEAE Spurge Family

Chamaesyce chaetocalyx (Boiss.) Woot. & Standl. EUPHORBIA *tuvu'kpi*
Chamaesyce fendleri (Torr. and Gray) Small

HP2218