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MAIZE AND SORGHUM AS A MIXED CROP IN HONDURAS

EDGAR ANDERSON* AND LOUIS O. WILLIAMS**

Maize and sorghum are planted together but harvested at separate times over considerable areas in Central America. Although standard practice for certain types of climate and soils, it does not seem ever to have been referred to in print. The following account is based on our observations in the valley of the Río Yeguaré in central Honduras at an altitude of 2400 feet. From personal observation we believe these practices to be more or less typical of wide areas in Honduras, Guatemala, and Nicaragua.

PREPARATION OF THE LAND

The land chosen for the field is usually a low tangle of thorny shrubs, principally *carbón* (*Mimosa tenuiflora*) with associated weeds and grasses. Field size will depend upon the resources of the individual farmer and the lay of the land. Some of the fields are as small as half an acre; others will be of ten to twenty acres or more. Fields prepared in this way would previously have been in more or less deserted pastures often thickly infested with *carbón*. Sometimes former fields will be burned over if the weed and brush cover is lush enough to produce a hot enough fire; otherwise the land would have to be cultivated before the crop was sown. Sometimes in the dry season the brush and weeds will be chopped down and left to dry. At the very beginning of the wet season this slash is burned. Planting is deferred until there has actually been a rain. The combination of the burning followed by rain produces a soil almost as mellow as if it had been cultivated.

PLANTING

The unburned brush is kicked and piled out of the way and the planting proceeds. Each man uses a planting stick: a strong pole higher than his head, shod at one end with a sharp metal blade. The metal head is home-made from such odds and ends of steel or iron as may be available and no two of them are exactly alike. Each man carries two seed pouches tied around his waist, one for maize and one for sorghum. Most commonly they are *jicaras* (*Crescentia alata* and *C. cujete*,

* Missouri Botanical Garden, St. Louis.

** Escuela Agrícola Panamericana, Tegucigalpa, Honduras.

calabash tree fruits) though rawhide pouches and various other containers are frequently used. It will be seen that one of the men in the illustration (pl. 5, fig. 1) is wearing one *jicara* and one square container fashioned out of a box of corrugated cardboard. The men start at one end of the field and proceed across it in approximately straight lines, planting the grain in hills of four or five plants each. The planting stick is held in one hand and is forced vigorously down into the earth to the depth of several inches (pl. 5, fig. 2). It is then pushed forward with the arm while with the other hand the grains are dropped into the hole formed by the levered planting stick. The stick is then pulled out and, with the foot, soil is scuffed over the hole and the earth is compacted. The operation in its results and in most of the actual motions employed is remarkably similar to the planting of experimental plots of maize with patented hand planters such as were used in the United States corn belt before the advent of power machinery.

Sorghum and maize are planted in paired but distinctly separate hills, as shown in pl. 6, fig. 2. A hill of one is planted, then the planting stick is inserted a few inches to the right or left and the other grain is planted. Then the operator moves on to the next spot and again plants paired hills, one of sorghum and one of maize, and proceeds in this way across the field.

Still other crops are often planted in the same fields. At higher elevations potatoes are sown in approximately straight lines between the grain hills, and it is common practice to plant squash here and there throughout the corn field.

The field is usually cultivated once, using a heavy iron hoe (something like the grub hoes of the United States) on a long handle (pl. 5, fig. 3). In Guatemala very wide and heavy hoes fully twice the width of these are commonly employed. Weeds and sprouts are cleared out with this implement when the maize is about waist high and the field is then left to shift for itself (much as in the United States corn belt where it is said to be "laid by" after the last cultivation). The maize ripens first (or fails altogether if there is not sufficient rain during the wet season). It is harvested when convenient. If it is harvested fairly early when scarcely ripe the husks are pulled back, and the ears, tied together in pairs, are hung over a rope or a rafter. It may be left until well ripened; it is then usually stored in a corn bin (*troja*) within the house or adjacent to it. One of the most careful cultivators makes a temporary wall at the end of the crib with neatly piled ears whose inner husks have been left on the ear. The remaining ears, completely husked, are thrown in back of this wall. Sometimes the maize is stored temporarily on the plant, the stalks being bent over sharply just below the ear. In this way moisture is kept out of the ripening ears and bird damage is reduced to a minimum.

The sorghum ripens much later, during the dry season. By the end of December, all the maize will have ripened; most of it will be harvested; and even in a good year, much of it will have been consumed, mostly as human food. By this time, the sorghum will have tasseled and will be rapidly maturing in the dry weather. It is harvested during the dry season and is used as a substitute for maize when that crop was not sufficient and as a stock food and chicken food. The grains of

sorghum are frequently popped and made into "popcorn" balls (*alborotos*) though these may also be made from popcorn.

The interplanting of maize and sorghum thus distributes the labor and the harvest over a longer period and is particularly valuable in years when there is not sufficient rainfall to mature a good crop. To casual questioning the usual reply is that sorghum is raised for the chickens and maize for the family. Careful inquiry brings out the information that in bad years much of the sorghum is used as human food.

The maize grown in the valley of the Yeguaré, and in similar areas near by, is of a fairly well-marked type. It is prevailingly white (yellow becomes increasingly common at higher elevations), slightly dented, with short, tapering ears. Occasional red or blue kernels were found in all the fields we sampled and much more rarely a red- or blue-grained plant. Though not highly productive the variety has the ability to mature its ears quickly before the dry season sets in. The plants are characteristically about five or six feet high; they seldom are highly colored, and usually bear one or two ears. They certainly trace back, at least in part, to the "Zapaluta chica" of southern Mexico, a small vigorous white dent which is virtually independent of length of day. It is the basis of much of the early-seasoned white maize of hot and dry areas in Central America and the Caribbean since it has the capacity to hurry on and make an ear before the hot dry weather begins.

To casual inspection the sorghum planted in the valley of the Río Yeguaré is exceedingly variable. It is of different heights, and no two plants seem to have the same tassel type, which varies from very open to very dense. Careful study shows that most of the variation is centered in plant height and in the elongation of the tassel branches and that spikelet characters vary little or not at all from plant to plant. Specimens submitted to Snowden, the monographer of the cultivated Sorghums, were identified as *Sorghum caffrorum* var. *glabrescens*, a variety widely distributed in the Old and New World.

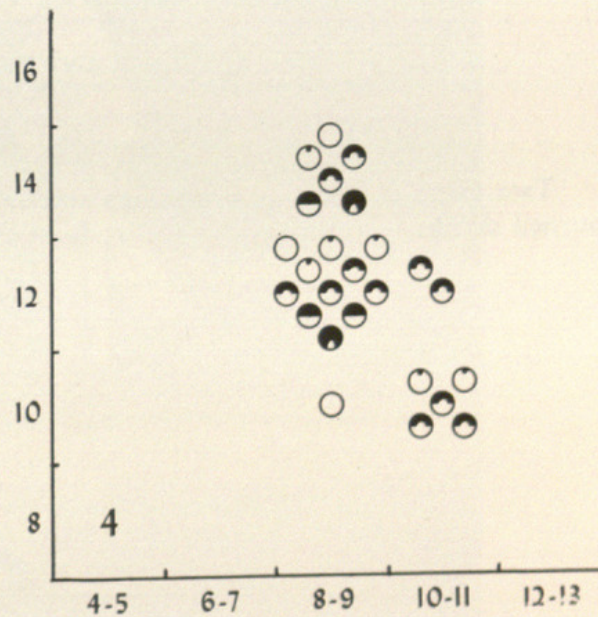
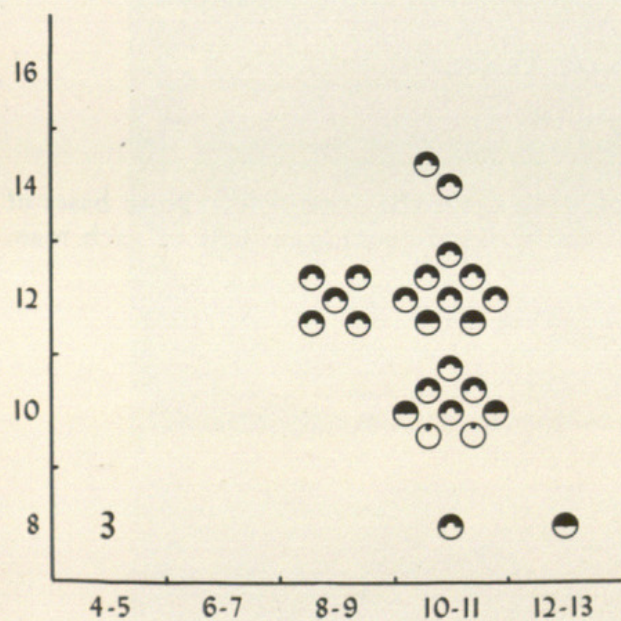
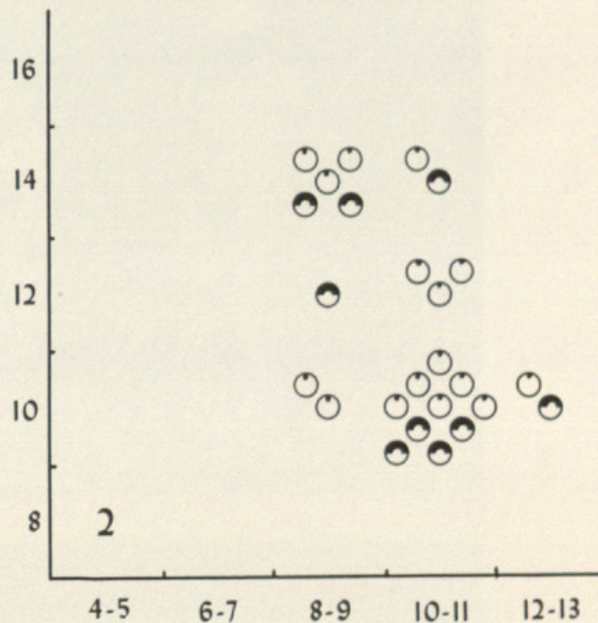
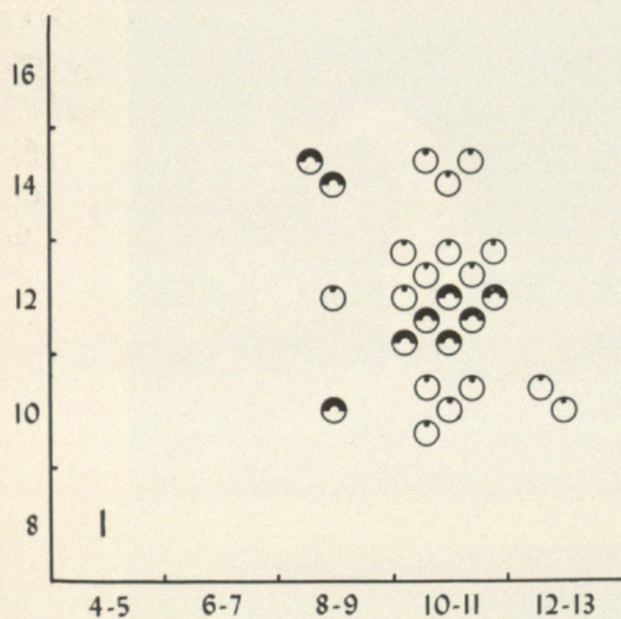
EXPLANATION OF PLATE

PLATE 4

Pictorialized scatter diagrams analyzing the variation in the same four samples of maize as shown in pls. 7 and 8, some of the ears of which are illustrated in those plates. Each sample consists of 25 ears chosen at random from the maize crib. Each circle represents a single ear, and the shape of the circle (see Anderson, Ann. Mo. Bot. Gard. 34:433-467. 1947) indicates that none of these ears bore pointed grains. The position of the circle shows the kernel width in mm. (horizontal scale) and the number of rows of kernels per ear (vertical scale). Open circles represent flinty ears with no apparent soft starch. The greater the degree of black the more soft starch (usually, but not inevitably, accompanied by denting of the kernel). For instance, in diagram 3, the circular glyph at the right represents an 8-rowed ear with kernels 12-13 mm. wide. Its kernels are unpointed and have a heavy deposit of soft starch. Other information from these four collections is as follows:

	No. 1	No. 2	No. 3	No. 4
Average mid-ear width	43 mm.	41 mm.	41 mm.	40 mm.
Average kernel thickness	41 mm.	40 mm.	39 mm.	40 mm.
Average shank diameter	12 mm.	11 mm.	12 mm.	10 mm.
Prevailing pericarp color	○	○	○	○
Prevailing aleurone color	○	○	○	○
Prevailing endosperm color	White	Yellow, white	White	White
Cob color	White	White	White	White
Off-types in sample of 25 ears	6 ears with some kernels with colored aleurone	All ears mixed yellow and white	22 ears with some yellow kernels, 6 ears with some kernels with colored aleurone	21 ears with some yellow kernels
Home of proprietor	Agua Amarillo	Santa Clara	Hda. Lizapa	Pedregal

Note how little variation there is between the averages for the four collections.



ANDERSON & WILLIAMS—MAIZE AND SORGHUM

EXPLANATION OF PLATE

PLATE 5

Two views of planting operations and one of weeding in the same field. Note bases of burned shrubs; planting sticks thrust forward; and two seed pouches on belt of each man.



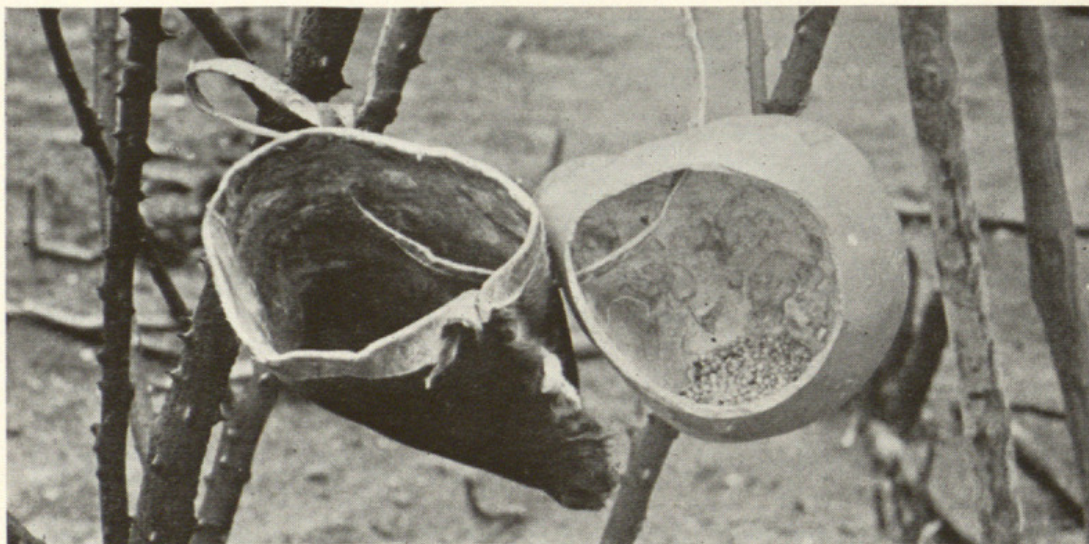
1



2



3



1



2



3

EXPLANATION OF PLATE

PLATE 6

Fig. 1. The two seed pouches worn by one man, one of leather, the other a *jicara*.

Fig. 2. Paired hills of maize (left) and sorghum (right) just as they begin to show clearly above the soil.

Fig. 3. Maize-sorghum field in late December. The sorghum is not yet quite mature. The maize has been harvested. Its drying tassels can be seen in between the sorghum heads and a little below them. The sorghum in this picture is more uniform in height and panicle than is usual in this area.



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