

Maize Measurement Guide used by the Berkeley Paleoethnobotany Lab

Written by William T. Whitehead using diagrams and information compiled by Christine A. Hastorf and Sissel Johannessen. 2004

This protocol is to be used for both modern and archaeological specimens, also for charred and uncharred specimens.

1. Kernels

- a. Data to record for each kernel measured:
 - i. Any site or geographic name (be as specific as possible)
 - ii. Any age, period, or phase determinations (again as specific as possible)
 - iii. Sample number, lot number or plot number
 - iv. Kernel or item number (to track individual measurements)
 - v. Ancient or Modern
 - vi. Kernel quality (whole, incomplete), (low fire, high fire), (distorted, undistorted).
 - vii. Charred or Uncharred
- b. How to record each measurement – all measurements are in mm to the nearest 0.5mm.
 - 1a: Kernel Height (Length) – is the maximum measure from the attachment area at the base of the embryo to the top of the kernel (measurement 1a on Figure 1).
 - 1b: Kernel Width – is the maximum measure along the cross-section of the kernel when it is in normal anatomical position along the cob (measurement 1b on Figure 1).
 - 1c: Kernel Thickness – is the maximum measure perpendicular to the width measurement (measurement 1c on Figure 1)
 - 2a: Kernel Angle – is the measure of the interior angle created by the left side of the kernel to the attachment point at the base of the embryo to the right side and is along the axis of the cross section when the kernel is in a normal position on the cob (measurement 2a on Figure 2). This is done using polar co-ordinate graph paper by placing the left side of the kernel parallel and touching the 0° line and moving the kernel toward the center of the graph paper circle until the right side is parallel and touching another line. Looking directly down on to the kernel, the angle is recorded in degrees. This measurement is not very accurate due to the fact that many kernels have rounded sides, are distorted from carbonization, and are hard to manipulate to get this measurement.
 - 3: Kernel Shape – is one of four letters – R = round, S = square, B = Beaked, and N = not determined (diagramed in Figure 3). Do not determine the shape of the end of the kernel if not present or damaged to the point it is not possible to determine the original shape.
- c. These measurements should be recorded in on the attached data entry worksheet with the provenance information.

2. Cupules

- a. Data to record for each cupule measured.
 - i. Any site or geographic name (be as specific as possible)
 - ii. Any age, period, or phase determinations (again as specific as possible)
 - iii. Sample number, lot number or plot number
 - iv. Kernel or item number (to track individual measurements)
 - v. Ancient or Modern
 - vi. Cupule quality (whole, incomplete), (low fire, high fire), (distorted, undistorted).
 - vii. Charred or Uncharred
- b. How to record each measurement – all measurements are in mm to the nearest 0.5mm
 - 4a: Cupule Width – is the maximum measure of the cupule at its widest point of the cupule along the cross section when the cupule is in a normal position on the cob (measure 4a on Figure 4).
 - 4b: Cupule Height – The height is the measure of the cupule from the base of the cupule to its highest point (measure 4b on Figure 4).

- 4d: Cupule Center Length – The measure from the front edge of the center of the cupule to the back edge of the cupule (exterior to exterior), when looking down on the cupule when it is in the normal position on the cob (measure 4d on Figure 4).
- 4c: Cupule Depth – The depth measure is taken with the dental tool, using the mm marks. Place the tool in the center of the bowl of the cupule and read the measure to the front edge of the cupule while resting the dental tool against the side of the cupule (measure 4c on Figure 4). This is not a very accurate measure due to the warping and distortion of the cupule and the problem of reading the marks on the dental tool.
- 2b: Cupule Angle – The angle measurement is taken in a similar fashion to the kernel angle measurement. The measure of the interior angle created by the left side of the cupule to the attachment point at the base of the cupule to the right side and is along the axis of the cross section when the cupule is in a normal position on the cob (measurement 2b on Figure 2). This is done using polar co-ordinate graph paper by placing the left side of the cupule parallel and touching the 0° line and moving the cupule toward the center of the graph paper circle until the right side is parallel and touching another line. The angle is recorded in degrees. This measurement is not very accurate due to the fact that many cupules have rounded sides, are distorted from carbonization, and are hard to manipulate to get this measurement.

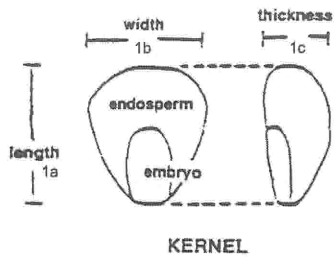
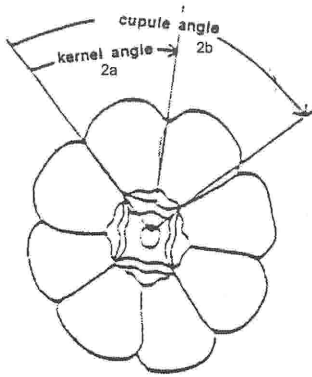
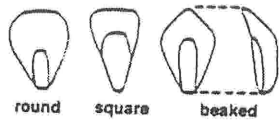


Figure 1



Cross section of maize ear

Figure 2



Cap types

Figure 3

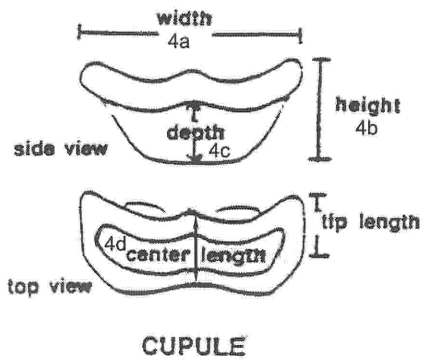


Figure 4

210°
150°

200°
160°

190°
170°

180°

170°
190°

160°
200°

150°
210°

220°
140°

140°
220°

230°
130°

130°
230°

240°
120°

120°
240°

250°
110°

110°
250°

260°
100°

100°
260°

270°
90°

90°
270°

280°
80°

80°
280°

290°
70°

70°
290°

300°
60°

60°
300°

310°
50°

50°
310°

320°
40°

40°
320°

330°
30°

340°
20°

350°
10°

0

10°
350°

20°
340°

30°
330°

