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1. Sterility and other seed characteristics in naturally occurring populations of teosinte.

In the fall of 1971 a hunt searching for useful mutants of teosinte in naturally occurring populations was headed by George Beadle and myself in Guerrero, Mexico. This opportunity to collect extensively for seven days a population over a 40 km transect near Teloloapan, Guerrero enabled me to collect data on sterility in a wild population of teosinte. The data reported below are derived from a sample for each plant based on the total number of fruitcases found in the third from the tassel (usually the most productive) fruiting node. This node bears 3-18 spikes, usually 5 to 10, with an average of 7 or 8 fruitcases per spike.

The seed in teosinte is enclosed in a rachis segment and the seed and rachis segment are referred to as a fruitcase. If the rachis segment is totally white there was no pollination and no development of the seed. The causes for this condition are numerous; examples are: late flowering, where the silks emerged but no pollen fell on the silks, the silks failed to emerge from the enclosing shucks, an insect ate the emerging silks, etc. The white fruitcases are most abundant at the last nodes to flower (i.e., the nodes closest to the tassel and the most basal). The first node to flower is usually the third node from the tassel and in this node only the last of the spikes to develop bear white fruitcases with usually the entire spike being white.

If a single seed in a spike is unpollinated but the seed above and below are pollinated then the rachis tissue in the area of the vascular traces is colored but the rachis flaps and enclosing lower glume are white. In these fruitcases no trace of the seed or arrested seed is visible and these are recorded as non-fertilized fruitcases.

The last class of fruitcases includes those in which the rachis segment is fully pigmented and only the enclosing lower glume is white. Such fruitcases contain a shrunken seed which is defective and to date I've not been able to germinate any of these recovered defective seed.

These are recorded as defective seed in the chart. The data for teosinte growing wild in Mexico are to a degree comparable with those for maize reported by Mangelsdorf (1926) and reviewed by Crumpacker (1967).

Site number	Number of plants scored	Number of fruitcases	Number of white fruitcases	Number of partial white fruitcases	Number of defective seed in fruitcases
1	187	3253	443	77	108
2	344	3175	425	129	41
3	1079	6005	875	212	103
6	969	9229	1290	261	118
7	908	4203	623	262	78
9	855	7141	1035	99	82
10	751	8071	1095	211	107
11	1250	7917	1320	370	92
13	552	7082	992	112	123

During the intensive look at teosinte fruitcases, several further observations about the shape, size, and coloring of the fruitcases were made. These observations and conclusions have been made over a ten year period, but this large collection of seed was an opportunity to test these conclusions. The fruitcase color of a single plant is constant but seldom do surrounding plants exhibit the same color. The color varies from ebony to a bluish steel grey and appears to be due to the interaction of a two color system--one for brown/white and the other for grey/white, which are inherited as incompletely dominant factors. The single seed per plant collections can be sorted into eight different classes and support my observations. The selective advantage of a diversity of fruitcase color classes is obvious for a dispersal unit as large and heavy as that of teosinte, which when it falls to the ground is vulnerable to ground feeding animals, especially birds. The only birds observed to actually feed on teosinte were Cassidix mexicana (Boat-

Tailed Grackle), which take insects and occasionally seed from the node of the plant.

The fruitcase of teosinte is so heavy that there is good reason for it to be limited to hillsides where downhill dispersal is gravity affected and the triangular shape prevents rolling and promotes settling in cracks or behind rocks. There also is a fruitcase polymorphism of medium-sized (as distinct from the large fruitcase types of the race Chalco) and smaller fruitcase types in the population. This polymorphism is not correlated with the vigor of the parent plant. It is true that large vigorous plants producing over a thousand seeds possess the larger seed, but so do some of the small plants producing less than a hundred seed per plant.

These observations lend support to the thesis that teosinte in the Balsas basin is a wild plant adapted to its surroundings and quite distinct from teosinte of maize fields in the Valley of Mexico or Central Plateau of Mexico.

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1. Common ancestry of the primitive races of maize indigenous to the Ayacucho area in Peru.

We have studied an important collection of archaeological cobs extending back almost 4000 years from several sites (Ac 100, Ac 117, Ac 244) at Ayacucho, Peru excavated by Dr. R. S. MacNeish. The material comes from the type locality of Confite Morocho, an ancient race that Grobman et al. (1961) consider to be the most primitive living race that is ancestral to the more advanced races of both North and South America.

A preliminary inspection of the cobs revealed that some of the cobs fit Grobman's taxonomic data for the primitive races Confite