Giant Maize
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Zea mays sbsp. *mays* - *giganteum* might address plant height, ear length, or kernel size. The maximum plant height is well documented, but the maximum ear length and kernel size are not.

KERNEL

Cuzco: the Ecology vs Heritance of the Giant Kernel

The author has not encountered a publication on the reproducibility of the kernel size of Cuzco Gigante maize. Gigante is included with the first strains mentioned in the literature, said to have a kernel of one-inch width. However, it should be established that the dimension is a maximum, not an average. Perhaps the kernel "use to be bigger," just as with old claims of plant height and ear length. Will one inch happen when Gigante grows in New York?

Kernels from the banks are small (CIMMYT and USDA), alarmingly so. A lucky kernel may reach an inch in length. Can this mean that the size is from ecology? Can Puerto Rico and Mexico City not produce the kernel size generated from the arid, highland, tropical sun of Peru? Even kernels from Don Shaver grown downhill from Machu Picchu on the clog railway are small, albeit larger than from the banks.

Kernels from the specialty food supplier(s) approach an inch in width … not average, but more commonly. These are kernels skimmed from a native harvest of scientifically bred Gigante (cf. a company webpage), creating a largest grade (personal communication, DL Shaver 2000-2008) for premium sale.

The specialty kernels were recently cultivated in New York and given long-night treatments (2014). Very unexpectedly, the possibility of one-inch width was reproduced, but only before the kernels dried. It was out of four cobs.

Inherently, the conducive environment appears necessary to see the kernel size, depending upon what size actually exists from diversity in the extant genome.

EAR

The Longest Ear is Missing from Science

Bona fide use of the expression maize "ear" length stipulates the length of kernel row. The author has never encountered either a photo or analysis of an ear

longer than 16 inches. Incredible dialog was created about longer ears by allegedly credible people who are drawn into suspicion by the categorical nonexistence of information of any use in understanding the existence of longer ears, which is troubling to the foundation of maize science.

PLANT

The Tallest Plant: Leaves vs Internode Length

Maize height is doubled by both greenhouse plastic and night length. The two phenomena are additive: normal maize height is 10 ft, which doubles to 20, which doubles to 40.

Greenhouse coverings double internode length (from 8 to 16 inches) by increasing the ratio of red light, and nightlength doubles internode quantity (from 25 to 50) by delaying the differentiation of the (leafing) apical meristem. More than 50 internodes occur regularly within the world's extant diversity of 19th Century maize, and an internode length of 18 inches is now well established (2014, ISBN 9781512074567).

To the natural maximum height of the maize subspecies (40 ft), three public mutations exist (*indeterminate*, *Leafy*, and *delayed flowering*; *Glossy* decreed illegal by the global cartel) that can further increase height via adding internodes … though it is generally unknown whether their interaction with night length, or even internode length, is (i) mutually exclusive, (ii) cumulative, or (iii) synergistic.

Apriori, the interaction between night length and *indeterminate* creates two reactions - one additive, and one a synergy of 10%; and the interaction between night length and *Leafy* is additive (2013 short-night greenhouse observation).

Each of the three mutations usually adds several leaves at minimum, entailing a leaf quantity and foot height of 70 to over 100. The pivotal question is whether or how much separation occurs between the extra leaves.

Without the nightlength reaction (10° latitude field and greenhouse; temperate field with nightlength extension; and complete generations without natural light), a leaf number of 24 has been seen below the ear (greenhouse), with enough leaves above the ear (primarily from the *Leafy* mutation; 20 or more seen; all environments) for a plant total greater than 40 (30 for *Leafy* by definition).

indeterminate has shown an addition of 9 leaves below the ear, and *delayed flowering* - 4 below and possibly 3 above.

Kuleshov (Amer Soc Agron 25:688, 1933) said that selfing the 19th Century strains may reveal revolutionary hidden attributes, and just such an attribute may have been revealed through that very procedure for such factors as those

contributing appreciable sums of leaves. Two are presently undergoing the basic tests for integrity as well as the pursuit of isolating any possible heritable essence bestowing long internodes.