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NEW YORK

The giant Jala maize. Even again.

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PEPITILLA

Evidently Catholics were in Jala even before Jala was in Jala (1500's) [1,2]. Likely before 1890-1910 [3] it seems that Pepitilla [4,*1] came to the valley and crossed with Jala [5]. Before the cross, Jala may have had a maximum plant height that was greater than the "over twenty feet" account of 1924 [6,7]. Likewise, its maximum cob length may have been longer than 24", and the cob may have not exceeded10-12 kernel-rows [5]. Pepitilla had a somewhat shorter plant and cob, and the cob had a higher row quantity (e.g. 15 [8] rows). So the cross may have reduced the plant height and cob length to the dimensions in Kempton's account, and likewise increased the row quantity (12.7 mean [9]). Pepitilla-polluted maize has been called "chino" [3] because it looked different and was unfamiliar. Recent information [5,4,10] conveys that there have been two morphological motifs in the Jala population of the Jala Valley. These motifs are Pepitilla and the aboriginal (pre-Pepitilla) Jala [10]. And the Pepitilla motifs are called chino also by the valley citizens. Jala and Pepitilla amalgamated, 'chino' has been used to identify Pepitilla, regardless of how polluted it is. So-interestingly, a USDA accession import log from 1918 indicated an isolated observational creed that Pepitilla from Guagalajara had the tallest-plant [11].

> "No. 147 – July 1918
> Zea Mays (Poaceae) 46056. Corn. From Mexico. Presented by the Estate of Diego Moreno, Guadalajara, Jalisco. Maiz pepitilla. ... The stalk grows more than that of any other corn and generally each stalk bears two ears if the land is ordinary, and three or more ears if the land is very good.... The cob is very slender and grain is very long; hence the yield is high.... (Moreno.)"
>
> "No. 149 – September 1918
> Zea Mays (Poaceae), 46314. Corn. From Mexico. Presented by Mr. Arnulfo Ballesteros, La Barca, Jalisco, at the request of Mr. John R. Sillman, American Consul, Guadalajara. Early Pipitillo corn, which is cultivated in the swampy lands of Chapala. ..."

Jala plants too occurred around Lake Chapala. Definitely, irrespective of this note, Pepitilla (and its derivatives Horsetooth, Gourdseed, Old Virginia silage corn, Shoepeg) has more history of great plant height than most maize (Old Virginia Silage Corn recounted by M. Wood of the town of Welshfield in Geuga County, Ohio, as growing in a thickett in a recess of the field of the family farm in 1954; the tallest stalk specimen, with scrupulous crystal-clarity, measured 27'6").

TEPIC

Evidently it has been exactly one hundred years since the USDA received one or two 22" cobs from an acquaintance who obtained the cobs in Tepic [6,7,*c]. Many and various seeds were travelling in to the USDA from the American consuls [11]. Around 1917, the Jala Valley farms were forced to coalesce into one large tract and be publicly operated [6,12,5]. In 1918, G.N. Collins declared that the "largest" cobs of maize came from Mexico [13]. Estimably it was the 22" Tepic cobs to which he was referring. At this time the USDA likely posessed Guatemalan cobs that equalled the length of the Tepic cobs [7].

BUREAU OF PLANT INDUSTRY

Probably in 1923, the USDA made a trip to Tepic solely to locate where the cobs grew. They found it to be the town of Jala, having no difficulty finding ears that were as long as the ones that they had received a decade-and-a-half earlier, and "the local citizens even at the time were talking of the good old days when the corn grew taller and the ears were larger" [7]. By 1924, the USDA had grown seed from the Tepic cobs for multiple seasons in Lanham, Maryland (effectively Washington D.C.) and at least once in Chula Vista, California (effectively San Diego) [9]. In May of 1924, A. Longley made the, ostensibly, second reference to the cobs in his article that divulged that the maize variety from which they grew was not polyploid [*b]. An ensuing reference to this maize came in what may be the first article in which the 22" Tepic maize was called "Jala" [9]. This was an article by Kempton, which was published in June of 1924, reporting a study of quantitative traits via the sensational hybridization of Jala with Gaspe. The article published data of Jala grown subtropically ex-situ.

EXOTIC

125 plants of the Tepic Jala were grown in Chula Vista and averaged 17' in height, waxing at 21', and the cobs averaged 10" and waxed 15. The plants were 3' shorter in California than in Nayarit, and in Maryland they approached the same height as in Nayarit. The Jala Valley has an 11-hour night, Chula Vista 10-hr, and Maryland 9. With its irrigation, the Chula Vista Jala might be anticipated to have been as tall as, or slightly taller than, the Nayarit Jala because it had one hour less of nightlength. Because the Chula Vista Jala was antithetically shorter, the Jala Valley must have had an exceptionally good environment. The critical nightlength of maize's qualitative long-night flowering response lies around 10 hours. Taking Jala to Maryland unequivocally transcended this threshold and, ceterus paribus, should have made the tall-tropical Jala much taller in Maryland than Nayarit. But this was not the case. Jala hardly managing the same height in Maryland as in Nayarit was a second proof that the Jala Valley environment was, puzzlingly, somehow extraordinarily superior.

3'

Then in August of 1924 was the famous article of Kempton's, recounting his excursion to Jala [6]. This memorative, bibliography-free article alluded to the Bureau's [*b] two other studies

involving Jala. In 1939 an unsourced datum was produced, that Jala ears (not cob) were 3' long [14]. This can seem accurate seeing the ears in the 1924 Journal of Heredity photo in comparison to the size of the riders, and accounting for a shank that is the longest of all races [8] being proportional to a 2' cob.

LIMON

In 1942, Eduardo Limon was growing Jala at the experimental station near León, Guanajuato [15]. He graduated from Iowa State in 1935 and was hired by the Bank of Mexico as a herdsman but began breeding corn despite this [16]. He peregrinated back up to the U.S. ca. 1940 to collect maize seed and the Mexican maize improvement program began in 1941, created from his breeding work [17]. He had obtained Jala seed somehow, perhaps as the decade turned. Perhaps he saw the Jala in the Jala Valley.

1944

Nonetheless, after 1924, there are no particularly obvious reports from the Jala Valley until possibly 1944, when a probable Wellhausen associate was there to collect seed [18], which is seen to be the oldest Jala germplasm available. This associate would likely be the source of Wellhausen's current in-situ Jala information for the 1951 monograph [8]. And Wellhausen obtained the ex-situ Jala data in the monograph from the 1945-etc. growouts mostly in Chapingo.

SMALLER

In the 1951 report it is evident that something had occurred with the morphological dimensions of the race. The monograph was unable to relate superlatives as august as those of Kempton. It indicated that the plants in the Jala Valley no longer averaged 20', but were now a diminutive 15 (the precise same height figure that is given in present day). Accompanying this outline of the race was a statement that the ears were the largest in Mexico, however, with no mention at-all of native cob length. If Wellhausen had cognisance of data that Jala contemporaneously averaged more than 15', it seems that he would have mentioned the height reduction. Derelict of having extensively plumbed obscure files concerning this matter, it seems that Wellhausen, plainly, had Jala seed collected for his study in 1944 and grew it out in Chapingo in 1945-etc., so that all that he knew of Jala in situ would have come via the procurement of 1944, and peradventure from Limon or workers of the Mexican program.

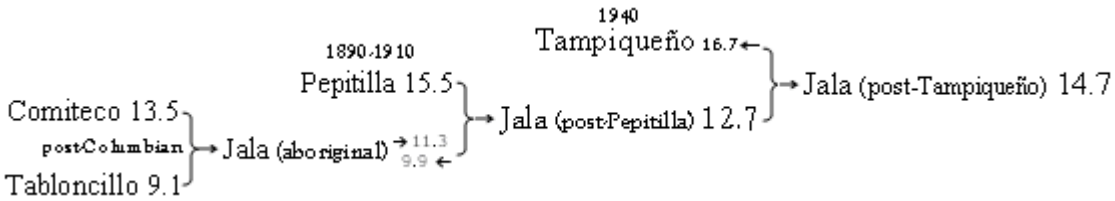
TAMPIQUEÑO

It would be perhaps unsuspected if the cob length had not concordantly diminished. It was precisely such a concordance that was found in the Jala Valley in 1947 [19]. The atrophy was corroborated. The longest cobs were 24" in ca. 1923, but now the longest that could be found were 15. The genetic profile coding for 9" of ear length and 5' of plant height was gone from Jala germplasm. And in this visit, a second type of maize was remarked upon, in pointed contrast to Kempton's relating the unusual uniformity of the population, and the absent need to distinguish any more than one name for the maize in the valley. This second type [*d] was Tampiqueño [20],

which perhaps came from the area of the Tamaulipan Gulf port city of Tampico [5] . This variety had a high row quantity (e.g. 14-16 rows [3]) like Pepitilla, which increased the post-Pepitilla (old) Jala row number from a mean of 12.7 to 14.7. (The Jala ear in the two 1924 journal photos was 12-rowed likely because the kernel size was more impressive [6] .)

KERNEL ROW

Putatively Jala was made from Tabloncillo introgression into Comiteco. Jala was a Comiteco-height plant, with hallmark long internodes from Tabloncillo, and a monstrously big ear birthed from the Comiteco genetic sequence [8] . Comiteco's row quantity is 13.5 and Tabloncillo's 9.1. Precisely between these two row quantities is the very row quantity that is thought to have been of the pre-Pepitilla Jala (the true húmedo Jala Valley maize [5]), 11. And then Pepitilla, 15.5 rows mean, may have come to the Jala Valley and infiltrated the aboriginal 11-rowed Jala to make the population that Kempton saw, which had ears with 12.7 rows, which is not too far off the median between the two parental row quantities. Tampiqueño, observed 16 rows, came into the Jala Valley and crossed with the post-Pepitilla Jala of 12.7 rows and made a post-Tampiqueño Jala of 14.7 rows, which has been influenced to this day. All-tolled, Jala may have begun with 11 rows, gained to 12.7 because of Pepitilla, and then gained to 14.7 from Tampiqueño. Kempton himself avered the credibility of row quantity for speculation [21] .



NOT TALLEST

The scientific literature believed that Jala had not only the longest ears but tallest stalks of all maize types [6,22] ; however, reasonably, this was incorrect [23,24,25] . Jala is even not member to the group of tallest maize types [26] , though, granted, Jala stalks have probably grown taller than any other type due to it being mistakenly publicized as being the tallest type. Jala is in the seeming penultimate group concerning height.

FUNK

The Funk Seed Company was employing Jala plants [*e] to signal the location and boundary of test strips and trial plots before 1955 [27,28] . Some of the seed was supplied by the Mexican satellite of the Funk Company, which purchased the seed from a Mexican supplier. It was conserved through Funks Puerto Rican and Hawaiian nurseries. It was used from the eastern shore of the U.S. to Minnesota, and from Ontario to Luisiana. Longtime Funk employees carried this use through Ciba, Novartis, and Syngenta, into 2005.

MARKER CORN

Under the assumed short night, and an ostensible shade effect, a tallest segregation group (tasseled) appears in this 'marker corn' at around 27'. One stalk measured 28'9" tall. With little doubt, this is the tallest that Jala has gotten, and the tallest segregation group height holds in the event that the 31' 1946 midwest maize is ever identified for-certain to have been Jala [*g] . Other morphological superlatives of the material (grown in a coldframe) have been: a tassel measuring 3'x3' (ped. incl.); peak internode length, five consecutive internodes, three measuring 17" and two measuring 16 (14" is the normal extreme); nodal roots 2.5' above the soil surface (other data for Jala might be quite higher than this) [*f] ; nearly 6' leaf length; ears originating 16' above the ground. Leaf quantity in Jala appears preserved over the past 100 years, with the maximum quantity of leaves being in the high 30's and averaging high-20's. The plants that have more leaves are not taller, but have shorter internodes; there appear to be two types of plant architecture in this population. Apparently, the height of the tallest segregation group in Jala diverges by 6' (21.3' - 27.3) due to internode extension dictated by shade, as opposed to discrepancy between night and day temperature.

18"

From the 15" post-Tampiqueno cobs, an initiative of 27 years has been precluded from elucting any more than 3" of additional cob length, rendering a potential reality that the final 6" that left the valley via the environment or genetics, left permanently [20,4] .

criterion	Pepitilla	old Jala (post-Pepitilla)	new Jala (post-Tampiqueno)
year	ca. 1945	ca. 1920	ca. 1945
plant height in-situ		20'	15'
plant height ex situ long-night	9' (12-hr)	17' (11-hr)	10' (12-hr)
leaf quantity	14.9	27.5	14.4
quantity of leaves above ear	5.1	6	5
tassel length	15.2"	14"	15.6"
tassel branch space	4.6"	8.7"	4.4"
tassel branch quantity	21.8	30.6	17.9
cob length in situ maximum		24"	15" (natural) (18" deliberate; 27-year)
cob length in situ		20"	
cob length ex situ maximum		15"	
cob length ex situ	4.8"	10.3"	12"
quantity of kernel rows	15.5	12.7	14.7
days to pollen	122	108.5-sic-118.5	134
weight of 1 kernel	.24	.56 (.8 on in-situ 12-row cob)	.51

29' stalk displayed at Canadian Royal Agricultural Winter Fair November 1999 right of center. 27.5' Jala left.

1 - Town of Jala municipal webpage. http://e-local.gob.mx/work/templates/enciclo/nayarit/mpios/18007a.htm

2 - Duncan and Hesketh 1968 Crop Sci.

3 - Anderson. Maize in Mexico. 1946. Annals Missouri Bot. Garden. 33:147-247

4 - Guzman, JA. Personal Comm. 2007

5 - Rice, EB. 2004. Ph.D. Thesis, Cornell University

6 - Kempton, JH. J. Heredity, 1924, p 337

7 - Weatherwax, P. Files. 1950, correspondence with W. Popenoe, and Kempton. Courtesy Lilly Library, Indiana University, Bloomington, IN. - by the generosity of N. Robinson

8 - Wellhausen. Races Maize Mexico. 1952

9 - Kempton 1924 J. Ag. Res.

10 - Rice, EB. Personal Comm. 2007

11 - Nos. 1-219 (August 1908- October 1924) of "Plant Immigrants" (NAL Call #: 1 P6915) from the Office of Foreign Seed and Plant Introduction for maize explorations in and introductions from Mexico. - by the exceptional generosity of W. Olson, National Ag. Library, Beltsville, MD

12 - Rice, EB. 2006. Genet. Resources Crop Evolution

13 - Collins 1918 J. Heredity. Tropical Var. Maize

14 - Mangelsdorf 1939. Origin Indian Corn, Relatives. Texas Ag. Exp. Sta. - this reference, great thanks to the Brandolinis

15 - MNL 1942 Mangelsdorf p 19

16 - Special Collections Department. Parks Library. Iowa State University. - entire courtesy of the quintessential generosity of B. Kuennen

17 - Matchett, K. Personal Comm. 2007

18 - GRIN http://www.ars-grin.gov/cgi-bin/npgs/acc/display.pl?1083152

19 - Weatherwax, P. MNL 1948 p 22

20 - Listman 1992 Diversity

21 - Kempton. J. Ag. Res. 1926

22 - Kempton. 1926. J. Hered. p 42. - reference via the generosity of A. Brandolini

23 - Sturtevant, EL. 1894 Torrey Bot. Club

24 - Sturtevant, EL. 1899 USDA Office Exp. Sta. Bull. 57

25 - Kuleshov, NN. 1933 J. Am. Soc. Agron.

26 - Karl, JR. Unpub. 2001

27 - Sywassink, D. Personal Comm. 2006-2007

28 - Briggs, RW. Personal Comm. 2007

*a - seems to be Pipitillo. Perhaps this spelling was simply a phonetic deduction, and masculine because it was used by the natives with reference to maize, which is a masculine word. As the monograph limpidifies, the name Pepitilla came because the kernel looked like a little ("-illa") pumpkin seed ('pepita'). The pumpkin is 'Cucurbita pepo', the pumpkin name feminine. So that may be why Pepitilla is feminine.

*b - Journal of Agricultural Research

*c - S.E.Magill tenanted the American Consul in Guadalajara, supplying the USDA with a variety of samples of maize from the Guadalajara region of Mexico. He is the greatest candidate; however, no information has confirmed that he was the acquaintance.

*d - maíz de húmedo is maize that germinates using condensation, "humidity", as opposed to rain - "maíz de aguas". Jala is the variety in the Jala Valley known as maíz de húmedo though other varieties of maize can germinate via humedad. Most other varieties are maiz de aguas. Jala is planted early in April and maiz de aguas is planted in June once the year's rains have begun.

*e - in company with a maize called Minnesota Purple, of which, several rows were planted to delineate the perimetry of the field-trial plots on two sides; Jala served to be the corner posts of the plots, the 'marker corn', and Minnesota Purple served as the 'border corn'.

*f - as opposed to a Coscomatepec-race accession which has roots 11 feet above the ground despite internode brachism due to heat injury

*g - the source of the seed appears to have not been a public one.