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Earliest Musa banana from the late Quaternary sequence at Fahien Rock Shelter in Sri Lanka

Supplementary Online Materials (**SI**)

SI1: Phytolith extraction and microscopy

SI1a: Fossil phytoliths

Sediment samples of 10-15 g were dried at 40º C and passed through 2 mm sieves. $CaCO_3$ was removed from the fraction passing the sieve using 10% HCl at 40º C. The material was centrifuged at 2000 rpm for 5 minutes. The supernatant was decanted and the remaining suspension checked with 1% $AgNO_3$ solution to ensure removal of $CaCO_3$. The material was oxidized in 40 ml of 30% H_2O_2 at 80-90º C in an oven for 2-3 hours. After cooling, a few drops of Ammonia solution were added to check for excess H_2O_2. The resulting suspension was passed through a150 µm sieve to remove coarse sand. The fraction less than 150 µm was mixed with 20 ml 0.5% sodium hexametaphosphate. Clay particles were removed using density gradient techniques based on Stoke's Law. The silty fraction was removed and dried. 0.5 g of dry material was mixed with 10 ml $ZnBr_2$ solution (density exactly adjusted to 2.35 gcm^3) in a centrifuge tube. It was allowed to settle for 30 minutes and centrifuged at 2000 rpm for 30 minutes. The phytolith fraction was removed, mixed with 1N HCl and centrifuged at 2000 rpm for 5 minutes. The final phytolith fraction was mounted in Canada Balsam and observed at a magnification of x 400 under the Olympus BX51 microscope. Images critical to phytolith identification were documented at a magnification of x 1000. Micrographs were taken using the F-View Soft Imaging System. Target counts were at least 250 (>250) and this was usually achieved. Counts of other siliceous microfossils (diatoms) were also included.

SI1b: Modern banana phytoliths

Modern wild and domesticated banana samples (reference samples) from Sri Lanka and southern India were used. Taxonomic assignment of the banana samples were confirmed with the available Herbarium records at the Laboratory for Palaeoecology, Postgraduate Institute of Archaeology, French Institute of Pondicherry, India and Royal Botanic Garden, Kew (cf. Perera, 2017). Phytolith extraction from well matured leaves at the 5th foliage leaf stage (n=71) and seed (n= 10) samples were was carried out both by ashing (Jenkins, 2009; Issaharou-Matchi et al., 2016) and chemical digestion methods (Geiss, 1973 and Carter, 2007), because the results from these methodologies reflect the possible impact of such stresses on phytoliths in the field over a long period of time and during the laboratory processing as well. Plant samples of 25 g were cleaned using a bleaching agent (Alconox) and dried in a ceramic crucible at 50º C for five hours in order to remove adhering minerals. Subsamples of 1g of dry plant materials were taken for ashing and further subsamples of 1g were taken for chemical digestion. As part of the ashing method the materials were incinerated at 500° C for 5 hours in a ceramic crucible using a muffle furnace. Siliceous residues were further treated with 1N HCl, centrifuged at 2000 rpm for 5 minutes (centrifuging shall, hereafter, indicate this speed and time). The residual pellet was cleaned with distilled water and centrifuged. The pellet was treated with 5 ml of concentrated HNO_3, kept in a water bath at 65° C for 2 hours and then centrifuged. The pellet was cleaned with distilled water, centrifuged and then dried at 60° C.

During the chemical digestion method, the materials were treated with concentrated H_2SO_4 (Sulphuric acid) at 80° C in a water bath for 4 hours by which time they had dissolved. The mixture was treated with 30% H_2O_2 on a hot plate at 150° C for 2-3 hours till it turned colourless. The obtained residue was cleaned with distilled water and the pellet was air-dried. A known weight of dry residue containing phytoliths obtained from both methods was separately mounted in both Canada balsam and Benzyl benzoate media.

SI2a: Discriminating wild banana phytoliths

Investigations were conducted on 71 samples from the modern wild (n = 11) and domesticated (n=60) banana phytoliths extracted from banana populations growing in different ecological conditions of Sri Lanka (Perera, 2017). Individual phytlith counts of 100 were obtained for each sample studied. These modern phytolith records from wild and domesticated banana helped to understand the phytoliths obtained from the archaeological sequence at Fahien rock shelter. Fundamentally, the results support initial works on banana phytolith morphologies (Vaydaghs et al., 2003; Lentfer, 2009; Ball et al., 2006, 2015). Two groups of wild bananas were recognized based on the morphology of seed phytoliths compared with the modern wild banana records (**Table SI1**). In these groups, *Musa*-type 1 (crater width = 1-2.5µm; basal length = 8-10 µm; shape = rectangular and square bases with few protuberances, and irregular faceted with elongate very irregular short grooves) and *Musa*-type 2 (crater width = 1-2.5µm; basal length = 3-7 µm; shape = variable base with more protuberances, and irregular faceted with elongate well defined regular long grooves) were reported from the late Pleistocene samples. The morphology of *Musa*-type 1 and 2 is closely similar to the morphology found from the modern seeds of *M. accuminata* and *M. balbisiana* respectively (**Table SI1** and Perera, 2017). In many occasions, morphometric evidence from wild banana leaf phytoliths does not support the differentiation between *Musa*-type 1 and 2 due to overlaps (**Table SI1, SI6, SI7, SI9, SI11**). However, occasionally some leaf phytoliths (**Fig. SI1, SI11**) of *Musa*-type 1 (*M. accuminata*) appear larger than *Musa*-type 2 (*M. balbisiana*).

SI2b: Discriminating wild and domesticated banana phytoliths

With the background knowledge from banana phytolith investigations (Vaydaghs et al., 2003; Lentfer, 2009; Ball et al., 2006, 2015; Perera, 2017), the records of morphological (i.e. protuberances and surface pattern) and morphometric (i.e. crater and basal lengths) variations of volcaniforms from our own collection was facilitated to differentiate between domesticated and wild banana phytoliths recovered from the Fahien samples (**Table 3**, **Table SI2, SI3, SI4, SI5, SI8, SI10**). Perera (2017) shows that impact of ecological changes (e.g. rainfall increase/decrease) on the morphology of volcaniform variants (V1-V8) was not found to be a critical factor in discriminating wild and domesticated bananas. The work also suggests that larger crater width and basal length more likely to have a connection with genetic condition (genomic signature) of the banana studied. Morphologically, basal length > 21.24 µm and crater width > 8.22 µm from the most common V1 and V3 with their protuberances directly marked the domesticated phytoliths (**SI1**; **SI10; SI11**; Perera, 2017; Vrydaghs, 2003; Lentfer, 2009; Ball et al., 2006, 2015). Usually, domesticated bananas (hybrids/cultivars) produce relatively larger phytoliths than wild diploid (AA and BB) bananas growing in Sri Lanka. V1 and V3 have a tendency to be of higher occurrence in wild and domesticated bananas (cf. Vrydaghs et al., 2009). In domesticated bananas, protuberances are very predominant on V3. This variant is rarely found from wild bananas (**Fig. SI2-9**). Psilate-granulate patterns are commonly found from wild bananas while granulate-verrucate patterns are found from domesticated bananas. A summary of the data is presented below.

Table SI1: Morphology of wild banana seed and leaf phytoliths. Total individual counts (N) per sample = 100

Modern wild banana seeds				
M. accuminata	1.97±0.30 range: 1-3.2	10.75±2.18 range: 8-18	Irregular faceted with elongate very irregular short grooves. Rectangle and square base with few verrucae.	
M. balbisiana	1.8±0.35 range: 1-3.2	8.62±2.25 range: 6-12	Irregular faceted with elongate well defined regular long grooves. Variable base with more verrucae.	
Modern wild banana leaf				
	Crater (µm)	Basal (µm)		
M. accuminata	7.07±0.89 range: 6.18-7.96	15.31±3.76 range:11.55-9.07	Cone is visible with variants. V1 (84-85%), V3 (11-16%), V6 (1%), V5 (3-4%) are reported. V2, V4, V7, V8 are absent. Rectangle and square base with more protuberances dominate at the base of V6. Psilate-granulate with very few verrucate found.	Not available
M. balbisiana	7.62±1.06 range: 5.96-8.22	16.20±4.73 range:11.46- 21.24	Cone is visible with variants. V1 (67-85%), V3 (12-23%), V5 (1-12%), V6 (1-5), V8 (1-3), V4 (1) are reported. V2 and V7 are absent. Rectangle and square base with more protuberances dominate at the base of V6. Psilate-granulate with very few verrucate found.	Not available

Table. SI2. Variants of volcaniform phytoliths produced by cultivated banana samples collected from the wet zone (rainfall: 4000-2500 mm/yr). + indicates very minor occurrence. Freq. indicates the most common occurrence. N= 100

Cultivar/hybrid name (local langue)	**Genome type**	**Variants**								
			V1	V2	V3	V4	V5	V6	V7	V8
Amban (Ko 08)	AAA	%	59		31		4	6		
		Protuberances	Freq		+		+	. +		
		Surface pattern	Psilate to granulate							
Anamalu (Ni 19)	AAA	%	39		43	1	7	11		1
		Protuberances	Freq		Freq	+	+	+.		+
		Surface pattern	Psilate to granulate + few verrucae							
Bin-kesel (Ra 07)	AAA	%	61		28	1	4	6		
		Protuberances	Freq		Freq	+	+	+		
		Surface pattern	Psilate to granulate + verrucae							
Cavandish (Ni 17)	AAA	%	45		39	8	2	3		3
		Protuberances	Freq		Freq	+	+	+		+
		Surface pattern	Psilate to granulate + few verrucae							
William Hyb. (Ma 65)	AAA	%	36		38		6	10	1	9
		Protuberances	Freq		Freq		+	+	+	+
		Surface pattern	Granulate to psilate + verrucae							
Ambul (Ni 20)	AAB	%	48	1	36	1	7	8		3
		Protuberances	Freq	+	Freq	+	+	.+		+
		Surface pattern	Psilate to granulate + few verrucae							
Kolikuttu (Po 36)	AAB	%	63		33			4		
		Protuberances	Freq		Freq			. +		
		Surface pattern	Granulate to psilate + few verrucae							
Muwanathi-kesel (Ma 54)	AAB	%	79		17		3	1		
		Protuberances	Freq		+		+	+.		
		Surface pattern	Granulate to psilate + verrucae							

Puwalu (Ma 51)	AAB	%	43		30	2	3	11	1	10
		Protuberances	Freq		Freq	+	+	. +	+	+
		Surface pattern	Granulate to psilate + verrucae							
Suwandal (Ma 64)	AAB	%	55		25	4	6	6		4
		Protuberances	Freq		Freq			.		
		Surface pattern	Psilate to granulate + verrucae							
Neithrapalam (Ma 61)	AAB	%	27	1	21	2	11	28	7	3
		Protuberances	Freq	+	Freq	+	+	+.	+	+
		Surface pattern	Granulate to psilate + verrucae							
Udakombu (Ma 52)	AAB	%	27		32	3	7	29		2
		Protuberances	+.		Freq	+	+	Freq		+
		Surface pattern	Psilate to granulate + verrucae							
Atamburu (Ma 60)	ABB	%	58		30		4	8		
		Protuberances	Freq	+	Freq	+	+	+.		+
		Surface pattern	Psilate to granulate + few verrucae							
Alu-kesel (Ko 09)	ABB	%	71		21		4	4		
		Protuberances	Freq		+		+	. +		
		Surface pattern	Psilate to granulate + verrucae							
Seeni-kesel (Ka 04)	ABB	%	62		30		4	4		
		Protuberances	Freq		Freq		+	.+		
		Surface pattern	Granulate to psilate + few verrucae							
Mondan (Ma 69)	ABB	%	65		23		8	4		
		Protuberances	Freq		+		+	. +		
		Surface pattern	Psilate to granulate							
IC2 (Ma 72)	AAAA	%	48	1	23	2	11	7	2	6
		Protuberances	Freq	+	Freq	+	+	. +	+	+
		Surface pattern	Psilate to granulate + verrucae							
Kandula (Ma 68)	AAAB	%	43	2	24	6	8	13	1	3
		Protuberances	Freq	+	Freq	+	+	+.	+	+
		Surface pattern	Psilate to granulate + few verrucae							
Pulasthi (Ma 59)	AABB	%	24		31	1	17	27		
		Protuberances	+		Freq	+	+	+		
		Surface pattern	Granulate to psilate + verrucae							
Neithrapalam (Ma 61)	AAB	%	27	1	21	2	11	28	7	3
		Protuberances	Freq	+	Freq	+	+	. +	+	+
		Surface pattern	Granulate to psilate + verrucae							
Udakombu (Ma 52)	AAB	%	27		32	3	7	29		2
		Protuberances	+.		Freq	+	+	Freq		+
		Surface pattern	Psilate to granulate + verrucae							
Atamburu (Ma 60)	ABB	%	58		30		4	8		
		Protuberances	Freq	+	Freq	+	+	. +		+
		Surface pattern	Psilate to granulate + few verrucae							
Alu-kesel (Ko 09)	ABB	%	71		21		4	4		
		Protuberances	Freq		+		+	+		
		Surface pattern	Psilate to granulate + verrucae							
Seeni-kesel (Ka 04)	ABB	%	62		30		4	4		
		Protuberances	Freq		Freq		+	. +		
		Surface pattern	Granulate to psilate + few verrucae							
Mondan (Ma 69)	ABB	%	65		23		8	4		
		Protuberances	Freq		+		+	+.		
		Surface pattern	Psilate to granulate							
IC2 (Ma 72)	AAAA	%	48	1	23	2	11	7	2	6
		Protuberances	Freq	+	Freq	+	+	. +	+	+
		Surface pattern	Psilate to granulate + verrucae							
Kandula (Ma 68)	AAAB	%	43	2	24	6	8	13	1	3
		Protuberances	Freq	+	Freq	+	+	. +	+	+
		Surface pattern	Psilate to granulate + few verrucae							
Pulasthi (Ma 59)	AABB	%	24		31	1	17	27		
		Protuberances	+		Freq	+	+	+		

		Surface pattern	Granulate to psilate + verrucae

Table. SI3. Variants of volcaniform phytoliths produced by cultivated banana samples collected from the wet montane zone (rainfall: 4000-2500 mm/yr). N = 100

Cultivar	**Genome type**		**V1**	**V2**	**V3**	**V4**	**V5**	**V6**	**V7**	**V8**
		%	82		17		1			
		Protuberances	Freq		+		+	.		
Amban (Nu 127)	AAA	Surface pattern	Granulate + few verrucae							
		%	76		24					
		Protuberances	Freq		Freq.			.		
Ambul (Nu 128)	AAB	Surface pattern	Psilate to granulate **+** few verrucae							
		%	94		5		1			
		Protuberances	Freq		+		+	.		
Seeni-kesel (Nu 135)	ABB	Surface pattern	Psilate to granulate **+** few verrucae							

Table. SI4. Variants of volcaniform phytoliths produced by cultivated banana samples collected from the dry zone (rainfall: 1700-1100 mm/yr). N = 100

Cultivar	**Genome type**		**V1**	**V2**	**V3**	**V4**	**V5**	**V6**	**V7**	**V8**
		%	69		28		2	1		
		Protuberances	Fre		Freq			.		
Amban (Ja 98)	AAA	Surface pattern	Psilate to granuate + very few verrucae							
		%	70		30					
		Protuberances	Freq		Freq					
Anamalu (Ja 101)	AAA	Surface pattern	Psilate to granuate							
		%	70		30					
		Protuberances	Freq.		Freq					
Cavandish (Ja 96)	AAA	Surface pattern	Psilate to granuate							
		%	82		16		2			
		Protuberances	Freq.		+		+			
Amban (Ha 36)	AAA	Surface pattern	Psilate to granuate + verrucae							
		%	72		20		1			
		Protuberances	Freq.		Freq		+			
Anamalu (Ha 134)	AAA	Surface pattern	Psilate to granuate + verrucae							
		%	59		33		5	3		
		Protuberances	Freq.		Freq		+			
Amban (Da 27)	AAA	Surface pattern	Psilate to granulate + verrucae							
		%	79		25		2	1		
		Protuberances	Freq.		Freq		+			
Anamalu (An 124)	AAA	Surface pattern	Psilate to granulate + verrucae							
		%	75		23			2		
		Protuberances	Freq.		+			+		
Cavandish (Da 25)	AAA	Surface pattern	Psilate to granulate + verrucae							
		%	76		24					
		Protuberances	Freq.		Freq					
Ambul (Ja 99)	AAB	Surface pattern	Psilate to granuate + verrucae							
		%	90		10					
		Protuberances	Freq.		+					
Kolikuttu (Ja 95)	AAB	Surface pattern	Psilate to granuate + verrucae							
		%	80		16		3			1
		Protuberances	Freq		+		+	.		
		Surface pattern	Psilate to granuate + verrucae							
Ambul (Ha 40)	AAB	%	69		29		2			

		Protuberances	Freq.		Freq					
		Surface pattern	Psilate to granulate + verrucae							
Puwalu (Ha 43)	AAB	%	34	1	33		7	21		4
		Protuberances	Freq.	+	Freq		+	+		+
		Surface pattern	Psilate to granulate + verrucae							
Kolikuttu (Ha 39)	AAB	%	71		27		2			
		Protuberances	Freq.		Freq .		+			
		Surface pattern	Psilate to granulate + verrucae							
Suwandel (Ha 133)	AAB	%	79		20			1		
		Protuberances	Freq.		Freq			+		
		Surface pattern	Psilate to granulate + few verrucae							
Ambul (Ba 129)	AAB	%	77		21		2			
		Protuberances	Freq.		+		+			
		Surface pattern	Granulate + verrucae							
Ambul (TC) (Da 21)	AAB	%	70		29		1			
		Protuberances	Freq.		Freq		+			
		Surface pattern	Psilate to granulate + few verrucae							
Ambul (An 123)	AAB	%	59		37		3	1		
		Protuberances	Freq.		Freq		+	+		
		Surface pattern	Psilate to granulate + few verrucae							
Kolikuttu (Da 23)	AAB	%	80		15		4	1		
		Protuberances	Freq.		+		+	+		
		Surface pattern	Psilate to granulate + verrucae							
Puwalu (An 118)	AAB	%	84		13		3			
		Protuberances	Freq		+		+	.		
		Surface pattern	Psilate to granulate + verrucae							
Suwandel (An 122)	AAB	%	70		21		5	4		
		Protuberances	Freq.		Freq		+			
		Surface pattern	Psilate to granulate + verrucae							
Alu-kesel (Ha 41)	ABB	%	84		15		1			
		Protuberances	Freq.		+		+			
		Surface pattern	Psilate to granuate + few verrucae							
Seeni-kesel (Ja 136)	ABB	%	72		28					
		Protuberances	Freq.		Freq					
		Surface pattern	Psilate to granuate + verrucae							
Mondan (Ja 100)	ABB	%	79		21					
		Protuberances	Freq.		Freq					
		Surface pattern	Psilate to granuate + verrucae							
Mondan (Da 28)	ABB	%	77		19		4			
		Protuberances	Freq.		+		+			
		Surface pattern	Psilate to granulate + verrucae							
Seeni-kesel (Da 24)	ABB	%	81		14		4	1		
		Protuberances	Freq.		+		+	+		
		Surface pattern	Psilate to granulate + verrucae							
Seeni-kesel (Ha 46)	ABB	%	82		18					
		Protuberances	Freq.		+					
		Surface pattern	Granulate + verrucae							
Mondan (Ba 131**)**	ABB	%	84		16					
		Protuberances	Freq.		+					
		Surface pattern	Psilate to granulate + verrucae							
Alu-kesel (Da 22)	ABB	%	66		25		9			
		Protuberances	Freq.		Freq		+			
		Surface pattern	Psilate to granulate + verrucae							
Kandula (Ha 44)	AAAB	%	79		17		1	1		2
		Protuberances	Freq.		Freq		+	+		+
		Surface pattern	Psilate to granulate + verrucae							
Pulasthi (Da 25)	AABB	%	89		10					1
		Protuberances	Freq.		+					+

		Surface pattern	Psilate to granulate + verrucae

Table. SI5. Variants of volcaniform phytoliths produced by cultivated banana samples collected from the intermediate zone (rainfall: 2200-1700 mm/yr). N = 100

Cultivar name	**Genome type**		**V1**	**V2**	**V3**	**V4**	**V5**	**V6**	**V7**	**V8**
		%	79		20		1			
		Protuberances	Freq.		Freq.		+			
Amban (Me 29)	AAA	Surface pattern	Psilate to granulate + verrucae							
		%	65		33		1			1
		Protuberances	Freq.		Freq.		+			+
Anamalu (Me 31)	AAA	Surface pattern	Psilate to granulate + verrucae							
		%	83		15		2			
		Protuberances			+		+	.		
Ambul (Me 32)	AAB	Surface pattern	Psilate to granulate + few verrucae							
		%	67		28		3	2		
		Protuberances	Freq.		Freq.					
Suwandel (Ib 117)	AAB	Surface pattern	Psilate to granulate + verrucae							
		%	85		15					
		Protuberances	Freq.		Freq.					
Kolikuttu (Me 115)	AAB	Surface pattern	Psilate to granulate + verrucae							
		%	52		44		2	2		
		Protuberances	Freq.		Freq.		+	+		
Seeni-kesel (Me 30)	ABB	Surface pattern	Psilate to granulate + verrucae							
		%	82		16		2			
		Protuberances	Freq.							
Alu-kesel (Ib 34)	ABB	Surface pattern	Psilate to granulate + verrucae							

Table. SI6 Variants of volcaniform phytoliths produced by wild banana samples collected from the wet zone. N = 100

Variety name	**Genome type**	**Variants**								
			V1	V2	V3	V4	V5	V6	V7	V8
		%	68		12		12	5		3
		Protuberances	Freq		+		+	.+		+
Atikesel (Ma 71)	BB	Surface pattern	Granulate to psilate + verrucae							
		%	69		23		3	4		1
		Protuberances	Freq		Freq.		+	. +		+
Atikesel (Av 78)	BB	Surface pattern	Psilate to granulate + verrucae							
		%	70		19	1	5	4		1
		Protuberances	Freq.		+	+	+	+		+
Atikesel (Av 75)	BB	Surface pattern	Granulate to psilate + verrucae							
		%	79		14		3	2		2
		Protuberances	Freq.		+		+	+		+
Atikesel (Av 81)	BB	Surface pattern	Psilate to granulate + verrucae							
		%	67		31		1	1		
		Protuberances	Freq.		Freq.		+	+		
Atikesel (Av 119)	BB	Surface pattern	Psilate to granulate + few verrucae							
		%	85		12		3			
		Protuberances	Freq.		+		+			
Atikesel (Ra 125)	BB	Surface pattern	Psilate to granulate + few verrucae							

Table. SI7. Variants of the volcaniform phytoliths produced by wild banana samples from the wet montane zone. N = 100

Variety	Genome type		V1	V2	V3	V4	V5	V6	V7	V8
Atikesel (Mu 90)	BB	%	75		14		9	2		
		Protuberances	Freq.		+		+	+		
		Surface pattern	Psilate to granulate + verrucae							
Atikesel (Ya87)	BB	%	76		14		9	1		
		Protuberances	Freq.		+		+	+		
		Surface pattern	Psilate to granulate + verrucae							
Unel (Ri 127)	AA	%	84		16					
		Protuberances	Freq.		+					
		Surface pattern	Psilate-granualate + few verrucae							
Unel (Mu 91)	AA	%	84		11		4	1		
		Protuberances	Freq.		+		+	+		
		Surface pattern	Psilate to granulate + verrucae							
Unel (Mu 92)	AA	%	85		11		3	1		
		Protuberances	Freq.		+		+	+		
		Surface pattern	Psilate to granulate + verrucae							

Table. SI8. Summary of Variant % from cultivated bananas. + indicates less than 5%. N = 100

Ecology	Rainfall (mm/yr)	Elevation (m)	Genome	V1	V2	V3	V4	V5	V6	V7	V8
Wet Zone	4000-2500	400-900 (ca.700)	AAA	36-61	0	28-43	+	1-6	3-11	0	+
			AAB	27-79	+	17-36	+	3-11	1-29	+	+
			ABB	94	0	5	0	+	0	0	0
			Tetra	43-48	+	24-31	1-6	8-17	7-27	+	3-6
Montane Zone	2600-2200	1000-2000 (ca.1500)	AAA	82	0	17	0	+	0	0	0
			AAB	76	0	24	0	0	0	0	0
			ABB	94	0	5	0	0	0	0	0
Interme-diate Zone	2000-1700	400-600 (ca.500)	AAA	65-77	0	20-33	0	+	0	0	+
			AAB	67-85	0	15-28	0	+	+	0	0
			ABB	52-82	0	16-44	0	+	+	0	0
Dry Zone	1700-1100	100-500 (ca.300)	AAA	59-82	0	16-33	0	+	+	0	0
			AAB	34-90	+	10-37	0	+	+	0	+
			ABB	66-84	0	14-28	0	+	+	0	0
			Tetra	72-89	0	10-17	0	+	+	0	+

Table. SI9. Summary of Variant % from wild bananas. + indicates less than 5%. N = 100

Ecology	Rainfall (mm/yr)	Elevation (m)	Genome	V1	V2	V3	V4	V5	V6	V7	V8
Wet Zone	4000	400-900 (ca.700)	BB	68-85	0	12-31	+	1-12	1-5	0	+
Wet Montane Zone	2600	1000-2000 (ca.1500)	AA	84-85	0	11	0	+	+	0	0
			BB	75-84	0	11-16	0	9	+	0	0

Table. SI10. Summary of morphometrics (BL: basal length and crater width: CW) of cultivated bananas. N =100

Ecology	Rainfall (mm/yr)	Elevation(m)	Genome	BL µm (mean)	Range µm	CW µm (mean)	Range µm
Wet Zone (acid soil)	4000-2200	400-900 (ca.700)	Triploid and Tetraploid	18.46±5.77	12.69-24.23	8.63±1.58	7.05-10.21
Wet Montane Zone (acid soil)	2600-2200	1000-2000 (ca.1500)	Triploid and Tetraploid	17.73±4.97	12.76-22.69	8.41±1.01	7.40-9.42
Intermediate Zone(acid/base soil)	2000-1700	400-600 (ca.500)	Triploid and Tetraploid	16.65±4.65	12.00-21.30	7.99±1.12	8.87-11.11
Dry Zone (acid/base soil)	1700-1100	100-500 (ca.300)	Triploid and Tetraploid	18.11±5.35	12.76-23.47	8.45±1.31	7.14 to 9.77

Table. SI11. Summary of morphometrics (BL and CW) of wild bananas. N = 100

Ecology	Rainfall (mm/yr)	Elevation (m)	Genome	BL µm (mean)	Range µm	CW µm (mean)	Range µm
Wet Zone	4000-2200	400-900 (ca.700)	BB	16.36±4.88	11.48-21.24	7.15±1.00	6.15-8.15
Wet Montane Zone	2600-2200	1000-2000 (ca.1500)	BB	16.05±4.59	11.46-20.64	7.09±1.13	5.96-8.22
			AA	15.31±3.76	11.55-19.07	7.07±0.89	6.18-7.96

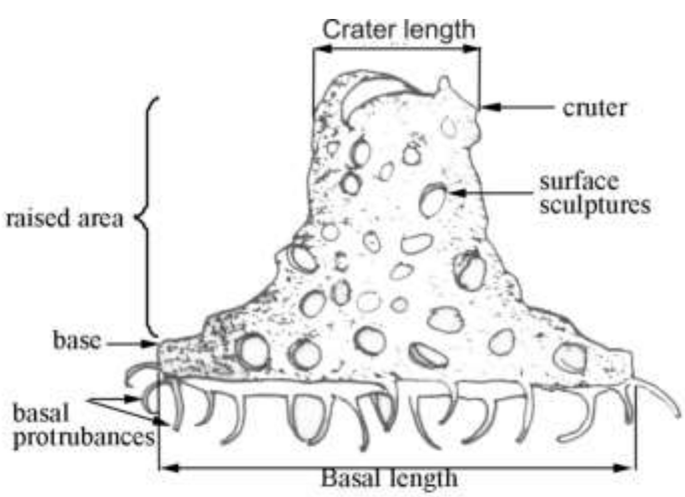

Fig. SI1. Morphology of a volcaniform phytolith from banana leaf.

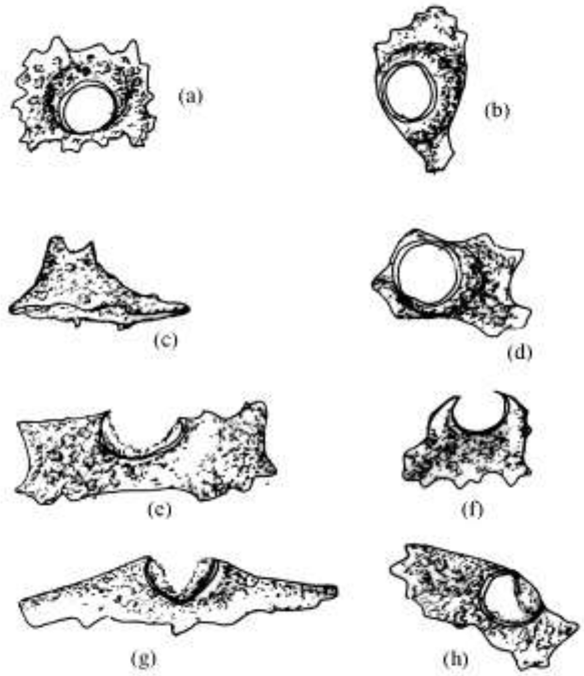

Fig. SI2. Morphology of 8 volcaniform variants (V1-V8) from banana leaf. (a) Variant 1 (V1):regular base, central concave cone, (b) variant 2 (V2): irregular base, central concave cone, (c) variant 3 (V3): regular base, acentric concave cone, (d) variant 4 (V4): irregular base, acentric concave cone, (e) variant 5 (V5): regular base, central convex cone, (f) variant 6 (V6): regular base, acentric convex cone, (g)- variant 7 (V7): irregular base, central convex cone, (h) variant 8 (V8): irregular base, acentric convex cone (adopted from Ball et al., 2006).

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