Phylogeography and the origin of domestication of Cassava : insights from G3*pdh* sequence data from cassava and wild relatives in the Guianas

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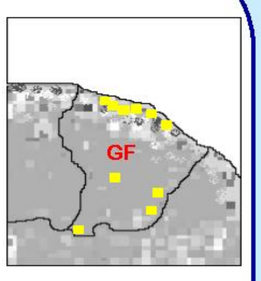
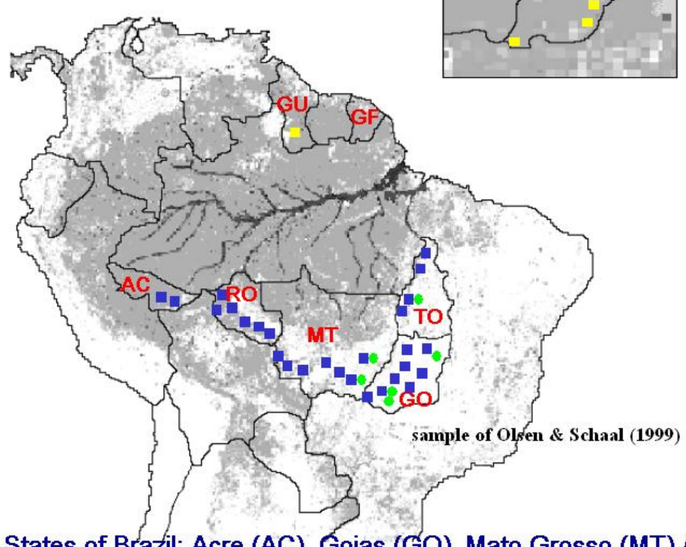
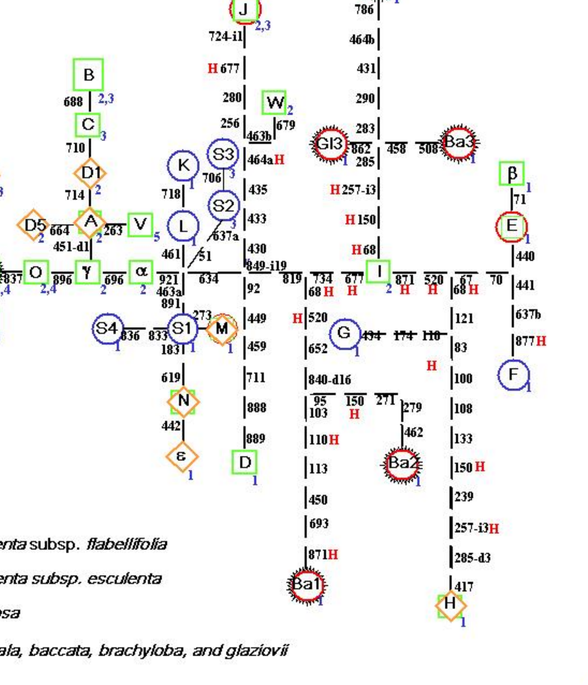
Wild cassava, in "rock-savanna" of an inselberg

Studied populations of *Manihot esculenta* subsp. *flabellifolia* (squares) and *M. pruinosa* (circles)



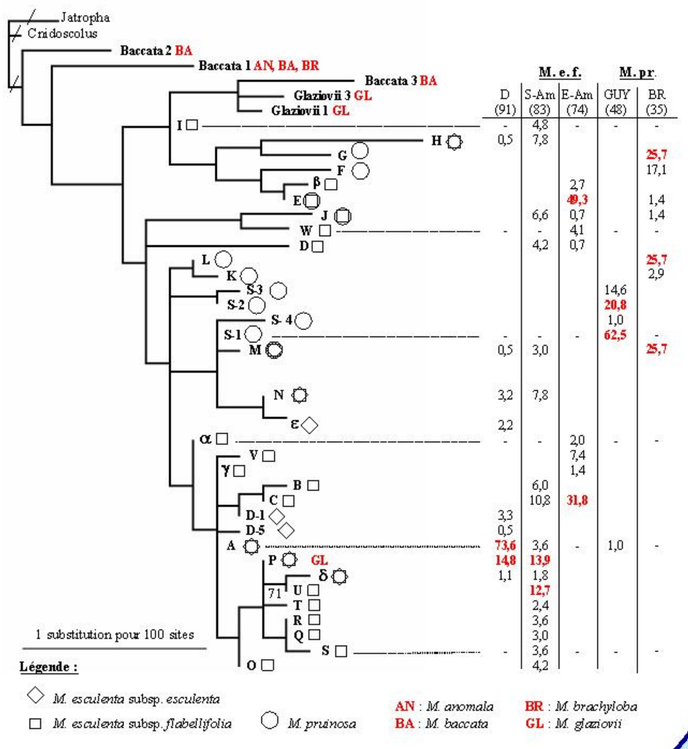


States of Brazil: Acre (AC), Goias (GO), Mato Grosso (MT), Rondônia (RO), Tocantins (TO);
French Guiana (GF), Guyana (GU).



Probable hybrid (F2?) of domesticated cassava and *M. pruinosa* (Sinnamary population, GF)

Phylogram obtained by maximum likelihood, sequences of G3pdh haplotypes



Domesticated cassava, a local variety of Palikur Amerindians

Network of alleles of G3*pdh* found in the genus *Manihot*

RESULTS

❶ Haplotypes of wild cassava from the Guianas are not shared with those of domesticated cassava.

❷ Wild cassava from the Guianas appears more closely related to *M. pruinosa* than to *M. esculenta* subsp. *flabellifolia*.

❸ Local Amerindian varieties of domesticated cassava from the Guianas are dominated by the same two haplotypes that dominate the CIAT core collection.

❹ These varieties also include new haplotypes similar to those known from related wild species.

❺ In one population in French Guiana, phenotypically intermediate individuals have one copy each of "domesticated" and "*M. pruinosa*" haplotypes.

❻ Analysis revealed evidence of interspecific hybridization between *M. esculenta* and *M. glaviovii*.

CONCLUSIONS

❶ It is unlikely that domesticated cassava originated in the Guianas.

❷ The affinities of wild relatives of cassava in the Guianas are with populations of *M. pruinosa* from the savannas of eastern Brazil.

❸ Cassava was domesticated along the southern/ southwestern rim of Amazonia and then diffused, probably rapidly, throughout Amazonia.

❹ Following domestication, the gene pool of cassava has been influenced by introgression from wild species encountered during its diffusion.

❺ Domesticated cassava naturally hybridizes with *M. pruinosa* in some sites in French Guiana.

❻ This molecular marker will be useful in detecting interspecific hybridization and studying reticulate evolution in the adaptive radiation of the genus *Manihot*.