



Candidate SSR tags for fruit and seed traits of *Theobroma cacao* L. in the International Cocoa Genebank Trinidad

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ISCR
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International Cocoa Genebank, Trinidad
26/07/2000 SCA 6 Tree 4 Field 6B

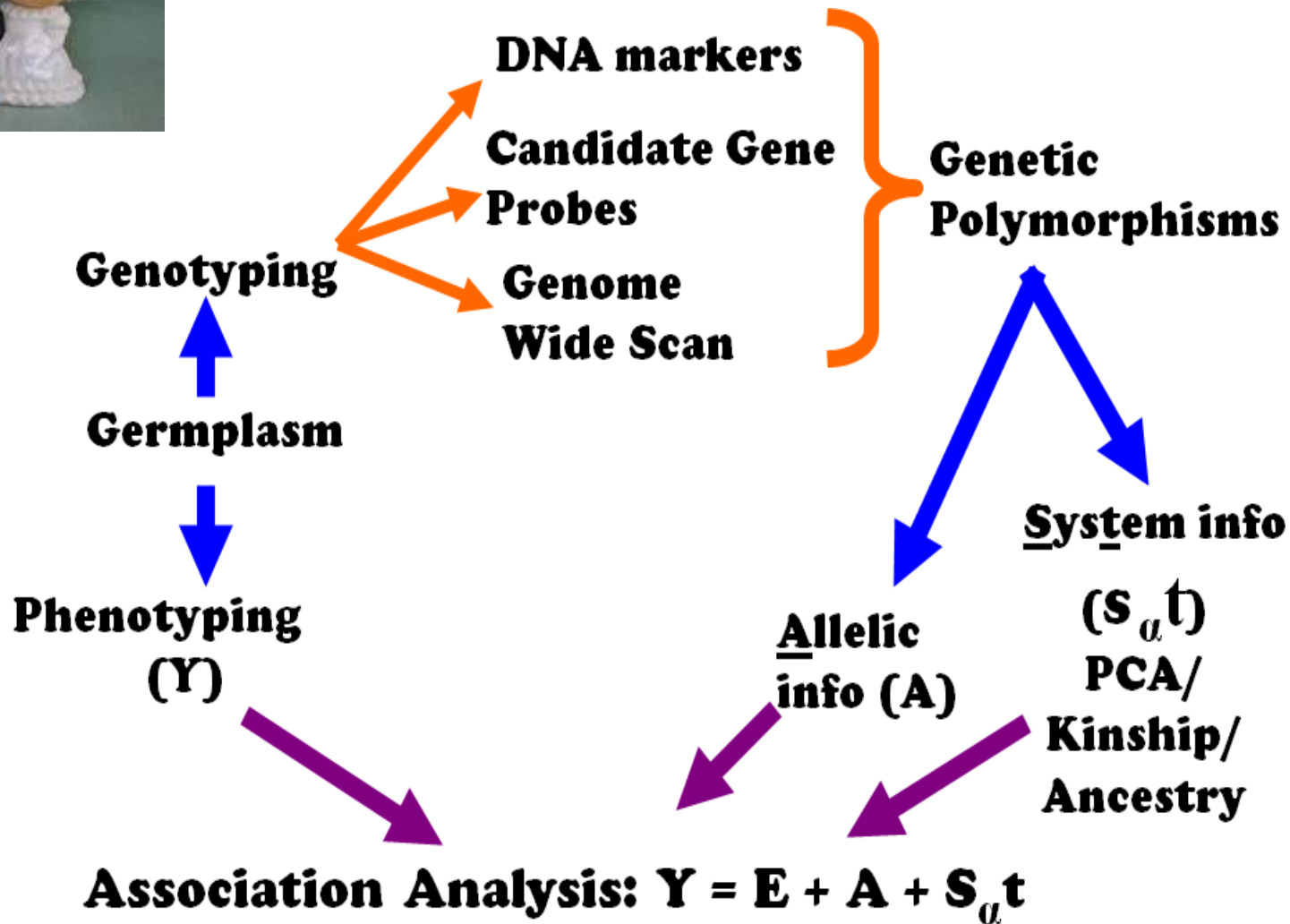
TSH - 1112



Candidate SSR tags for cacao



Methodology - Approach



GLM2: $Y = E + A + S_M t$ MLM3: $Y = E + A + S_M t + S_K t$

Candidate SSR tags for cacao

Methodology - Traits

Bean Trait

**Fresh bean length
(FBL)**

**Fresh bean size
(FBS)**

**Fresh bean width
(FBW)**

Fruit Trait

**Fruit girth
(FG)**

**Fruit length
(FL)**

**Fruit mass
(FM)**

**Fruit volume
(FV)**

**Husk mass
(HM)**

Candidate SSR tags for cacao

1



2



3



4



5



6



7



8



9



10

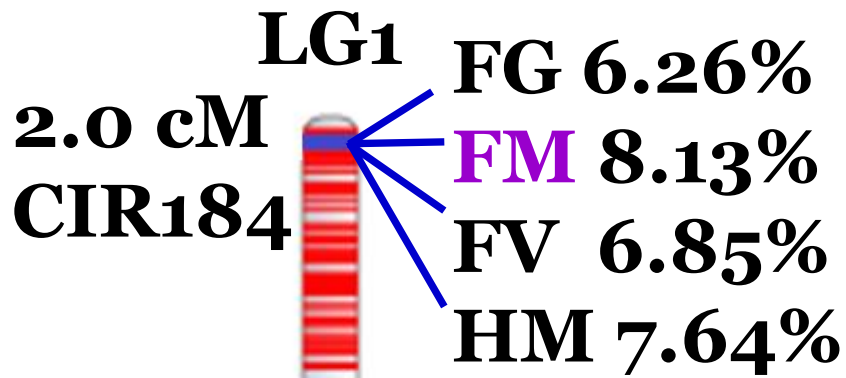


Candidate SSR tags for cacao

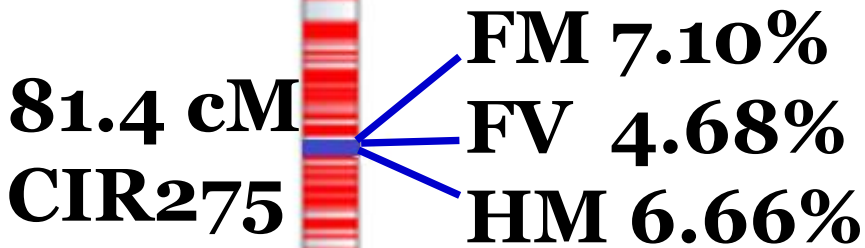
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Trait	# SSRs	Total Varn (%) Explained
Fresh Bean Length (mm)	4	41.1
Fresh Bean Width (mm)	1	9.34
Fresh Bean Size (cm²)	1	12.39
Fruit Girth (cm)	6	43.99
Fruit Length (cm)	1	7.11
Fruit Mass (g)	3	25.73
Fruit Volume (cm³)	4	24.65
Husk Mass (g)	4	29.78

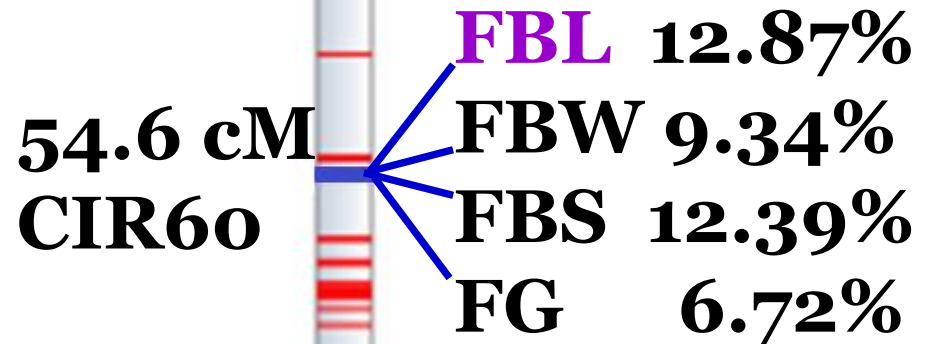
Candidate SSR tags for cacao



Marcano et al. 2007 FM

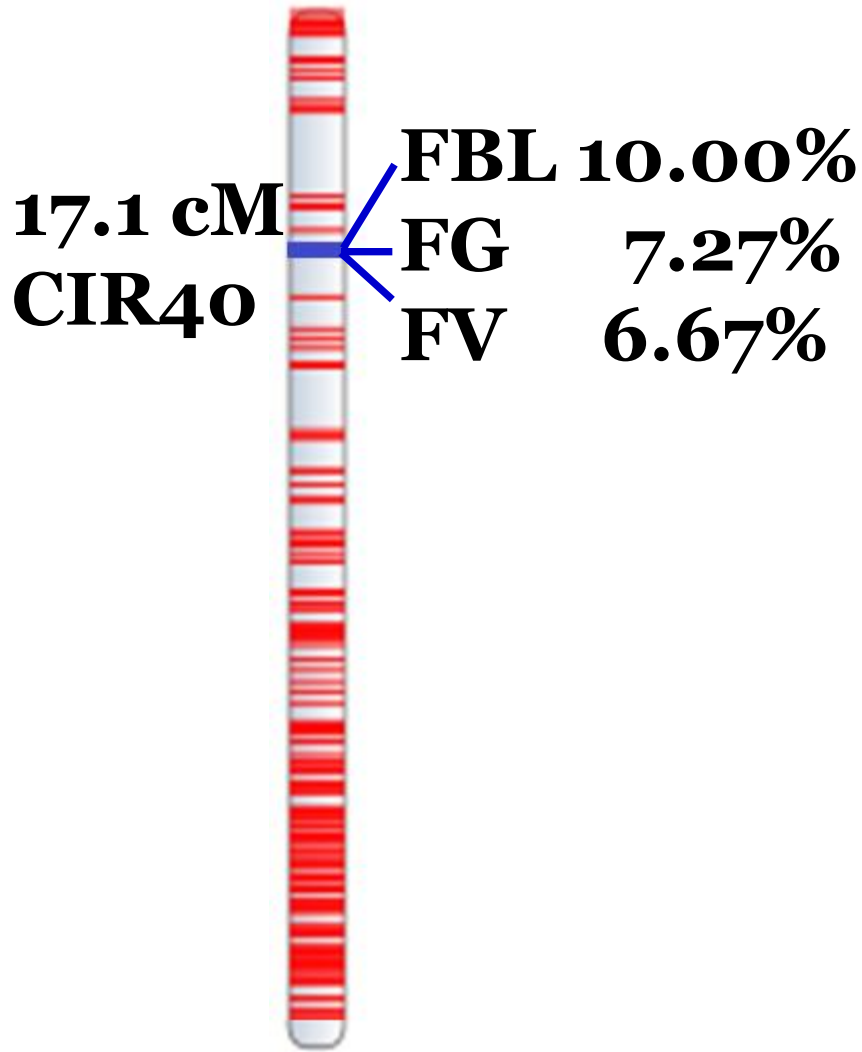


LG2

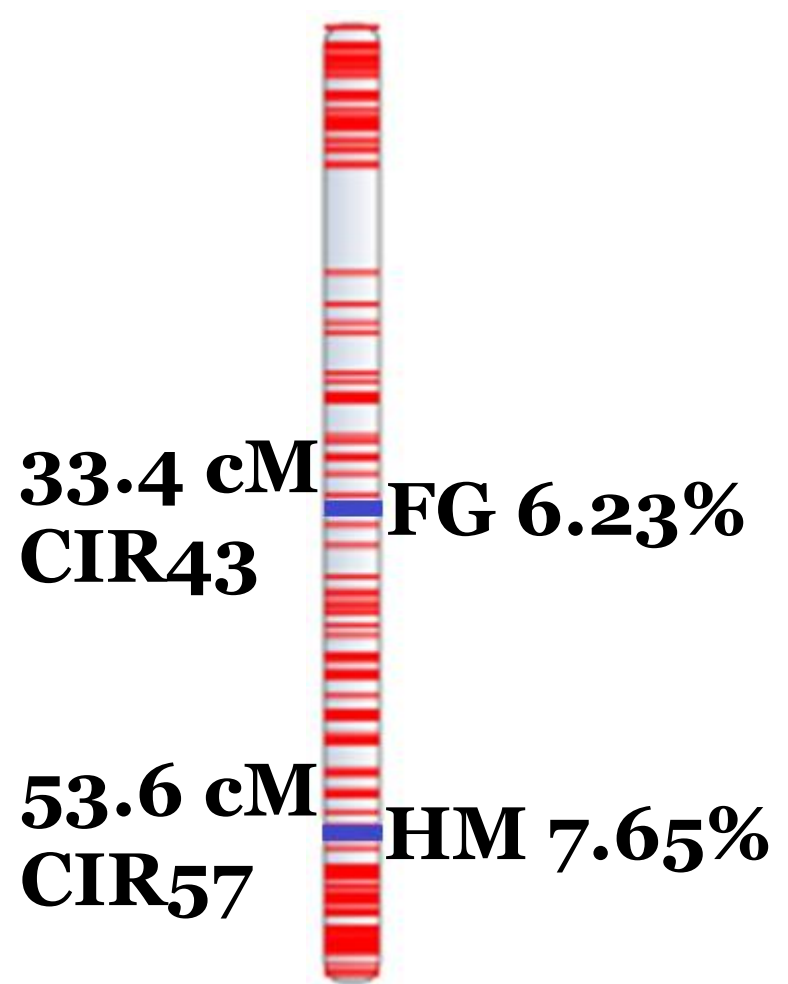


Marcano et al. 2009 FBL, FBW
Clement et al. 2003a,b FBL

LG3



LG4



LG9

9.70 cM
CIR126

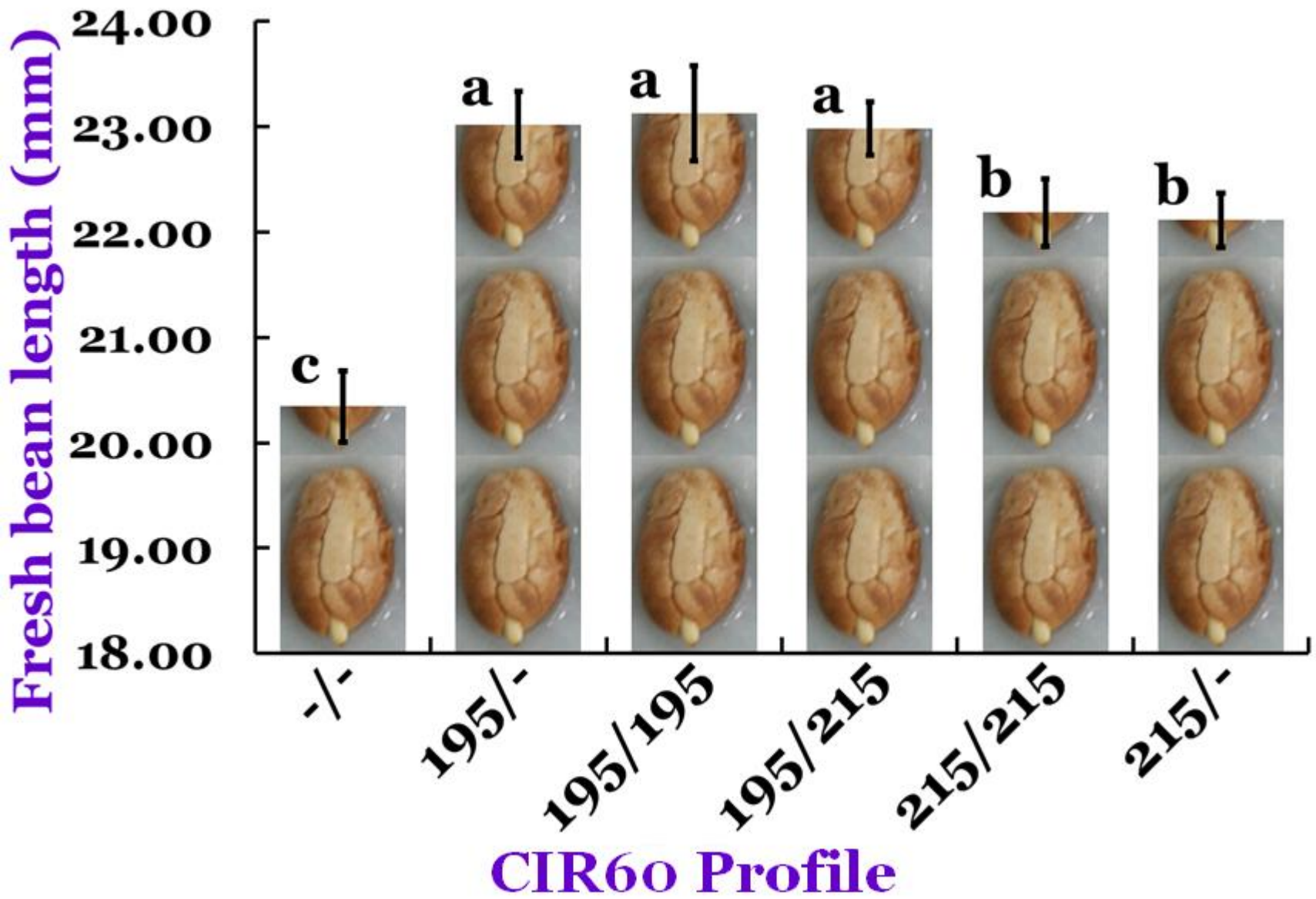
FBL 9.63%
FG 10.90%
FL 7.11%
FM 10.50%
FV 6.45%
HM 7.83%

Marcano
et al. 2009
FBL

22.1 cM
CIR30

FBL 8.60%





Candidate SSR tags for cacao

Are these good markers?



- 🎯 **Identified in different models.**
- 🎯 **Common in different datasets.**
- 🎯 **Stringent p-values and some even more so.**
- 🎯 **Markers had high effect size.**
- 🎯 **Common markers for related traits.**
- 🎯 **Support from QTL studies.**

Choose the Core!



Thank You!

**Government of Trinidad and Tobago Research Grant
for Campus Initiated Research Projects.**

Candidate SSR tags for cacao

Methodology – Tassel Analysis

SSR Data	# Ancestry markers	Ancestry filter ²	# SSRs for PCA & kinship ³	# SSRs	Models ⁴
B_all	none	none	43	95	GLM ₂ , MLM ₃
B1	52	Q10 to Q9	21	43	GLM _{2, 3} ; MLM _{3, 4}
B2	27	Q10 to Q9	32	68	GLM _{2, 3} ; MLM _{3, 4}

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