Multi-layered regulation of coconut endosperm solidification

GENOMIC CONTEXT

CDI: Chr5 16.2–22.1 Mb

- Fst (W5 vs CK) = 0.35 in CDI
- π ratio (CK/W5) = 407× at peaks
- Tajima's D = −1.90 (selective sweep)
- W5 ROH = 76% in CDI
- 1,104 annotated genes on Chr5

Developmental progression

EARLY (3–4 mpa)
Liquid endosperm

MID (5–7 mpa)
TRANSITION

LATE (9–11 mpa)
Soft kernel

TRANSCRIPTOME

- CK: 4,400 genes ↑ at mid-stage
- W6: 3,111 genes ↑ (intermediate)
- W5: 1,104 genes ↑ (streamlined)

Transcriptional streamlining during domestication

PROTEOME

- W5 vs W6: 4,695 DEPs (early)
- W5 vs W6: 2,987 DEPs (mid)
- Chloroplast, cell wall ↑ in W6

Translational regulation uncouples mRNA from protein

METABOLOME

- 8/12 classes reverse trend
- Sugars, amino acids → lipids
- Cell wall deposition at mid

Global metabolic reprogramming

PHENOTYPE: Liquid endosperm ⟶ Solid kernel | Thick shell (CK) ⟶ Thin shell (W5) | Sour water ⟶ Sweet water