

Table S1. Climatic growth condition for sweet potato.

Year	Month	Mean temperature (°C)	Precipitation (mm)	Field irrigation (mm)
2020	Nov.(Haikou)	23.40	14.80	100
	Dem.	19.07	6.20	
	Jun.	16.35	19.10	
	Few.	19.81	26.20	
2021	Mar.	24.20	2.00	100
	Nov. (Sanya)	26.65	10.20	
	Dem.	24.84	8.30	
	Jun.	22.56	15.60	
2022	Few.	24.36	14.30	
	Mar.	25.89	6.40	

Table S2. Experimental soil physical and chemical properties.

Experiment al sites	Sand content (%)	Soil density (g·cm ⁻²)	pH	Organic matter content (%)	Alkalihydrolysable nitrogen (mg·kg ⁻¹)	Available phosphorus (mg·kg ⁻¹)	Available potassium (mg·kg ⁻¹)
Haikou	50.4	1.41	6.84	1.21	52.56	9.01	80.63
Sanya	48.3	1.40	6.77	1.47	74.09	14.36	69.82

Table S3. Genes primer sequences used in qRT-PCR.

Gene	Forward(5'-3')	Reverse(3'-5')
<i>PAL</i>	GGATCCAAGAGTGCAGGTCC	CCTTGTCACATTCTCCCCG
<i>C4H</i>	GCGGCAAGAAGTACAAGCTC	CTTGGCGTAATCGGTGAGAT
<i>4CL</i>	CTGAGGATGAAGTTAAAGAGTTTGTG	GCCTGAGGGAGACTTTGGA
<i>HCT</i>	CCGTCGCTTACAGCTCCTAC	CGGTGGCTATGTACAGCTTG
<i>CCoAOMT</i>	GAGGCACCCACAAGACTACG	TGGTTGTCTGATTCTCCGCC
<i>CAD</i>	GTCTTGGCGCAGACTCTTTC	TAATGGCACAACAGCGTGAT
<i>Ibkn1</i>	AAAACCTCGGGAGATCACTGC	GCAAGCCTCCTCCAATCTC
<i>Ibkn2</i>	GCCAGGCAGAAAGTTGCTTAG	CAGTGCCGTTTTCTTTGGTT
<i>Ibkn3</i>	CGCCTAGGTCCATAATCC	TATTTCAAGGCGGTCTCA
<i>GBSS</i>	GGACGTGCTGAAGGTGATAA	CGAGAGCTCTTGTGACATGC
<i>Sps</i>	TCTGAAGATTTCTCGGATGA	AGTAAGGAGCATAGGCACA
<i>Susy</i>	CTTGAGATTTCGTCGCTACCTT	CTGAACCCTCCCTTCATCTTAC
<i>AGPase</i>	GCAGACTTGTCTAGATCCTGATG	CCGCTTCTTTGTGAGAGGATAG
<i>SSS</i>	GACTGTGGGATCTACTGAAAGG	TTGCTGGCTCCTGAGAATTTA
<i>SBEI</i>	CCTTCTCGTGGGTCTTTCATAC	ACCAGTAGTGCATGGTGAAG
<i>β-actin</i>	AGCAGCATGAAGATTAAGGTTGTAGCAC	TGGAATAATTAGAAGCACTTCCTGTGAAC