

GEPHE SUMMARY

<p>SHELL (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^SHELL^#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00001048</p> <p>Martin</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Morphology^#gephebase-summary-title)</p> <p>Fruit shell thickness (https://www.gephebase.org/search-criteria?/and+Trait=^Fruit+shell+thickness^#gephebase-summary-title)</p> <p>Elaeis guineensis; thick shelled</p> <p>Elaeis guineensis; thin shelled (Congo)</p> <p>Data not curated</p> <p>Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Domesticated^#gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon A</p> <p>Latin Name</p> <p>Elaeis guineensis (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Elaeis+guineensis^#gephebase-summary-title)</p> <p>Common Name</p> <p>African oil palm</p> <p>Synonyms</p> <p>African oil palm; Elaeis guineensis Jacq.; Elaeis guineensis var. tenera (Oil palm); Elaeis guinensis; Elaeis guineensis; Elaeis guineensis</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Arecales; Areaceae; Arecoideae; Cocoseae; Elaeidinae; Elaeis</p> <p>Parent</p> <p>Elaeis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51952)</p> <p>NCBI Taxonomy ID</p> <p>51953 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51953)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Elaeis guineensis (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Elaeis+guineensis^#gephebase-summary-title)</p> <p>Common Name</p> <p>African oil palm</p> <p>Synonyms</p> <p>African oil palm; Elaeis guineensis Jacq.; Elaeis guineensis var. tenera (Oil palm); Elaeis guinensis; Elaeis guineensis; Elaeis guineensis</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Arecales; Areaceae; Arecoideae; Cocoseae; Elaeidinae; Elaeis</p> <p>Parent</p> <p>Elaeis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51952)</p> <p>NCBI Taxonomy ID</p> <p>51953 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=51953)</p> <p>is Taxon B an Intraspecies?</p> <p>Yes</p> <p>Taxon B Description</p> <p>Elaeis guineensis; thin shelled (Congo)</p>
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GENOTYPIC CHANGE

<p>AGL11</p> <p>AGAMOUS-like 11; AGL11; SEEDSTICK; T5L19.90; T5L19_90; STK; At4g09960</p> <p>3702.AT4G09960.3 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT4G09960.3)</p> <p>-</p> <p>GO:0046983 : protein dimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0046983)</p> <p>GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p>	<p>UniProtKB Arabidopsis thaliana</p> <p>Q38836 (http://www.uniprot.org/uniprot/Q38836)</p> <p>GenebankID or UniProtKB</p> <p>()</p>
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GO:000977 : RNA polymerase II regulatory region sequence-specific DNA binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:000977>)

GO - Biological Process

GO:0045944 : positive regulation of transcription by RNA polymerase II
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045944>)

GO:0048481 : plant ovule development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048481>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

No ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null+No^#gephebase-summary-title))

Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type+Coding^#gephebase-summary-title))

Aberration Type

SNP ([https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type+SNP^#gephebase-summary-title))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

1a.a substitution in DNA binding domain

Experimental Evidence

Candidate Gene ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence+Candidate+Gene^#gephebase-summary-title))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

The oil palm SHELL gene controls oil yield and encodes a homologue of SEEDSTICK. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23883930>)

Authors

Singh R; Low ET; Ooi LC; Ong-Abdullah M; Ting NC; Nagappan J; Nookiah R; Amiruddin MD; Rosli R; Manaf MA; Chan KL; Halim MA; Azizi N; Lakey N; Smith SW; Budiman MA; Hogan M; Bacher B; Van Brunt A; Wang C; Ordway JM; Sambanthamurthi R; Martienssen RA

Abstract

A key event in the domestication and breeding of the oil palm *Elaeis guineensis* was loss of the thick coconut-like shell surrounding the kernel. Modern *E. guineensis* has three fruit forms, *dura* (thick-shelled), *pisifera* (shell-less) and *tenera* (thin-shelled), a hybrid between *dura* and *pisifera*. The *pisifera* palm is usually female-sterile. The *tenera* palm yields far more oil than *dura*, and is the basis for commercial palm oil production in all of southeast Asia. Here we describe the mapping and identification of the SHELL gene responsible for the different fruit forms. Using homozygosity mapping by sequencing, we found two independent mutations in the DNA-binding domain of a homologue of the MADS-box gene SEEDSTICK (STK, also known as AGAMOUS-LIKE 11), which controls ovule identity and seed development in *Arabidopsis*. The SHELL gene is responsible for the *tenera* phenotype in both cultivated and wild palms from sub-Saharan Africa, and our findings provide a genetic explanation for the single gene hybrid vigour (or heterosis) attributed to SHELL, via heterodimerization. This gene mutation explains the single most important economic trait in oil palm, and has implications for the competing interests of global edible oil production, biofuels and rainforest conservation.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

1 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^SHELL^/and+Taxon ID=^51953^/or+Gene Gephebase=^SHELL^/and+Taxon ID=^51953^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase+SHELL^/and+Taxon+ID+51953^/or+Gene+Gephebase+SHELL^/and+Taxon+ID+51953^#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS