

## GEPHE SUMMARY

para (kdr) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene Gephebase='para (kdr)'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene Gephebase='para (kdr)'#gephebase-summary-title</a> )	Gephebase Gene	GP00002631	GepheID
	Entry Status	Courtier	Main curator
Published			

## PHENOTYPIC CHANGE

Trait Category			
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait Category='Physiology'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait Category='Physiology'#gephebase-summary-title</a> )	Trait		
Xenobiotic resistance (insecticide) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait='Xenobiotic resistance (insecticide)'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait='Xenobiotic resistance (insecticide)'#gephebase-summary-title</a> )	Trait State in Taxon A		
Tuta absoluta - sensitive	Trait State in Taxon B		
Tuta absoluta - resistant from Greece	Ancestral State		
Taxon A	Taxonomic Status		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic Status='Intraspecific'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic Status='Intraspecific'#gephebase-summary-title</a> )			
Taxon A	Latin Name	Taxon B	Latin Name
Tuta absoluta ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Tuta absoluta'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Tuta absoluta'#gephebase-summary-title</a> )		Tuta absoluta ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Tuta absoluta'#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms='Tuta absoluta'#gephebase-summary-title</a> )	
-	Common Name	-	Common Name
Gnorimoschema absoluta; Phthorimaea absoluta; Scrobipalpula absoluta; Scrobipalpuloides absoluta; Tuta absoluta (Meyrick, 1917)	Synonyms	Gnorimoschema absoluta; Phthorimaea absoluta; Scrobipalpula absoluta; Scrobipalpuloides absoluta; Tuta absoluta (Meyrick, 1917)	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Gelechioidea; Gelechiidae; Gelechiinae; Tuta	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Gelechioidea; Gelechiidae; Gelechiinae; Tuta	Lineage
Tuta () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 702716">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 702716</a> )	Parent	Tuta () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 702716">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 702716</a> )	Parent
702716 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 702717">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 702717</a> )	NCBI Taxonomy ID	702717 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 702717">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 702717</a> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

Generic Gene Name			
para	Synonyms	P35500 ( <a href="http://www.uniprot.org/uniprot/P35500">http://www.uniprot.org/uniprot/P35500</a> )	UniProtKB Drosophila melanogaster
bas; bss; CG9907; Dmel\CG9907; DmNav; DmNav1; DmNa[[v]]; DmNa[[V]]; DmNa[[v]]; l(I)14Da; l(I)ESHS48; lincRNA.S9469; Nav1; Ocd; olfD; par; sbl; sbl-1; Shu; Shudderer	String	0	GenebankID or UniProtKB
7227.FBpp0303597 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0303597">http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0303597</a> )	Sequence Similarities		
Belongs to the sodium channel (TC 1.A.1.10) family. Para subfamily.	GO - Molecular Function		
GO:0005509 : calcium ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005509">https://www.ebi.ac.uk/QuickGO/term/GO:0005509</a> )			
GO:0005244 : voltage-gated ion channel activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005244">https://www.ebi.ac.uk/QuickGO/term/GO:0005244</a> )			
GO:0005248 : voltage-gated sodium channel activity			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005248>)

GO:0005272 : sodium channel activity

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005272>)

#### GO - Biological Process

GO:0045433 : male courtship behavior, veined wing generated song production

(<https://www.ebi.ac.uk/QuickGO/term/GO:0045433>)

GO:0001666 : response to hypoxia (<https://www.ebi.ac.uk/QuickGO/term/GO:0001666>)

GO:0009612 : response to mechanical stimulus

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009612>)

GO:0034765 : regulation of ion transmembrane transport

(<https://www.ebi.ac.uk/QuickGO/term/GO:0034765>)

GO:0035725 : sodium ion transmembrane transport

(<https://www.ebi.ac.uk/QuickGO/term/GO:0035725>)

GO:0007638 : mechanosensory behavior

(<https://www.ebi.ac.uk/QuickGO/term/GO:0007638>)

GO:0060078 : regulation of postsynaptic membrane potential

(<https://www.ebi.ac.uk/QuickGO/term/GO:0060078>)

#### GO - Cellular Component

GO:0005887 : integral component of plasma membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)

GO:0001518 : voltage-gated sodium channel complex

(<https://www.ebi.ac.uk/QuickGO/term/GO:0001518>)

Presumptive Null

No ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=%22No%22#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive%20Null=%22No%22#gephebase-summary-title))

Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=%22Coding%22#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular%20Type=%22Coding%22#gephebase-summary-title))

Aberration Type

SNP ([https://www.gephebase.org/search-criteria?/and+Aberration Type=%22SNP%22#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration%20Type=%22SNP%22#gephebase-summary-title))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

V1848I

Experimental Evidence

Candidate Gene ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%22Candidate Gene%22#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental%20Evidence=%22Candidate%20Gene%22#gephebase-summary-title))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Val	Ile	1881

Main Reference

Identification and detection of indoxacarb resistance mutations in the para sodium channel of the tomato leafminer, *Tuta absoluta*. (2017) (<https://pubmed.ncbi.nlm.nih.gov/28019074>)

Authors

Roditakis E; Mavridis K; Riga M; Vasakis E; Morou E; Rison JL; Vontas J

Abstract

Indoxacarb is an important active ingredient extensively used for the control of *Tuta absoluta*, a major tomato pest, playing a particular role in insecticide resistance management schemes.

Reduced susceptibility to indoxacarb was identified (1794-fold resistance) through toxicological bioassays in a field population from Greece and evolved rapidly to resistance after short laboratory selection. Combined bioassays with synergists and biochemical analysis suggested only a partial involvement of detoxification enzymes in the resistant phenotype. To investigate the role of target-site resistance, segment 6 of domain IV of the sodium channel in *T. absoluta* was cloned and the sequences compared between susceptible and indoxacarb-resistant *T. absoluta* insects. The presence of the F1845Y and the V1848I indoxacarb resistance mutations was detected and was strongly associated with the phenotype. These amino acid substitutions correspond to recently characterised indoxacarb resistance mutations in diamondback moth (*Plutella xylostella*). Robust and accurate PCR-RFLP assays were subsequently developed and successfully validated for detecting both indoxacarb resistance mutations in field *T. absoluta* populations.

The identification of indoxacarb resistance mutations and the development of diagnostic tools will allow early detection of indoxacarb resistance, facilitating implementation of appropriate resistance management strategies, thus delaying the spread of resistance. © 2016 Society of Chemical Industry.

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Additional References

Functional validation of target-site resistance mutations against sodium channel blocker insecticides (SCBIs) via molecular modeling and genome engineering in *Drosophila*. (2019) (<https://pubmed.ncbi.nlm.nih.gov/30572019>)

## RELATED GEPHE

Related Genes

2 (nAChR, RYR) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=%22702717%22/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon%20ID=%22702717%22/and+Trait=Xenobiotic%20resistance/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

4 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=%22para \(kdr\)%22/and+Taxon ID=%22702717%22/or+Gene Gephebase=%22para \(kdr\)%22/and+Taxon ID=%22702717%22#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene%20Gephebase=%22para(kdr)%22/and+Taxon%20ID=%22702717%22/or+Gene%20Gephebase=%22para(kdr)%22/and+Taxon%20ID=%22702717%22#gephebase-summary-title))

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