

## GEPHE SUMMARY

PSST ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+PSST+Gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+PSST+Gephebase-summary-title</a> )	Gephebase Gene	GP00002636	GepheID
Published	Entry Status	Courtier	Main curator

## PHENOTYPIC CHANGE

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 Category		
Xenobiotic resistance (METI-I acaricide) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Xenobiotic+resistance+(METI-I+acaricide)+Gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Xenobiotic+resistance+(METI-I+acaricide)+Gephebase-summary-title</a> )	Trait		
Panonychus citri - sensitive	Trait State in Taxon A		
Panonychus citri - resistant from Iran	Trait State in Taxon B		
Taxon A	Ancestral State		
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> )	Taxonomic Status		
	Taxon A	Taxon B	
Panonychus citri ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Panonychus+citri+Gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Panonychus+citri+Gephebase-summary-title</a> )	Latin Name	Panonychus citri ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Panonychus+citri+Gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Panonychus+citri+Gephebase-summary-title</a> )	Latin Name
citrus red mite	Common Name	citrus red mite	Common Name
citrus red mite; citrus fruit mite; Panonychus citri (McGregor, 1916); Panonychus citri	Synonyms	citrus red mite; citrus fruit mite; Panonychus citri (McGregor, 1916); Panonychus citri	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidae; Tetranychidae; Panonychus	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Chelicerata; Arachnida; Acari; Acariformes; Trombidiformes; Prostigmata; Eleutherengona; Raphignathae; Tetranychoidae; Tetranychidae; Panonychus	Lineage
Panonychus () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=50022">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=50022</a> )	Parent	Panonychus () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=50022">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=50022</a> )	Parent
50023 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=50023">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=50023</a> )	NCBI Taxonomy ID	50023 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=50023">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=50023</a> )	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

## GENOTYPIC CHANGE

ND-20	Generic Gene Name	Q9VXK7 ( <a href="http://www.uniprot.org/uniprot/Q9VXK7">http://www.uniprot.org/uniprot/Q9VXK7</a> )	UniProtKB Drosophila melanogaster
20 kDa; CG9172; Dmel\CG9172; Dmel.LCG9172; dNDUFS7; dNDUFS7A; ND20; NUKM; PSST	Synonyms	()	GenebankID or UniProtKB
7227.FBpp0073949 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0073949">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=7227.FBpp0073949</a> )	String		
Belongs to the complex I 20 kDa subunit family.	Sequence Similarities		
GO:0046872 : metal ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0046872">https://www.ebi.ac.uk/QuickGO/term/GO:0046872</a> )	GO - Molecular Function		
GO:0048038 : quinone binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0048038">https://www.ebi.ac.uk/QuickGO/term/GO:0048038</a> )			
GO:0051539 : 4 iron, 4 sulfur cluster binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0051539">https://www.ebi.ac.uk/QuickGO/term/GO:0051539</a> )			
GO:0008137 : NADH dehydrogenase (ubiquinone) activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0008137">https://www.ebi.ac.uk/QuickGO/term/GO:0008137</a> )			

GO - Biological Process

- GO:0000302 : response to reactive oxygen species  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000302>)
- GO:0008340 : determination of adult lifespan  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008340>)
- GO:2000331 : regulation of terminal button organization  
(<https://www.ebi.ac.uk/QuickGO/term/GO:2000331>)
- GO:0009060 : aerobic respiration (<https://www.ebi.ac.uk/QuickGO/term/GO:0009060>)
- GO:0015990 : electron transport coupled proton transport  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0015990>)
- GO:0032981 : mitochondrial respiratory chain complex I assembly  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032981>)

GO - Cellular Component

- GO:0005747 : mitochondrial respiratory chain complex I  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005747>)

- No ([https://www.gephebase.org/search-criteria?/and+Presumptive Null="No" #gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive Null=)) Presumptive Null
- Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type="Coding" #gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular Type=)) Molecular Type
- SNP ([https://www.gephebase.org/search-criteria?/and+Aberration Type="SNP" #gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration Type=)) Aberration Type
- Nonsynonymous SNP Coding Change
- H92R Molecular Details of the Mutation
- 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=)) Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	His	Arg	92

- Molecular and genetic analysis of resistance to METI-I acaricides in Iranian populations of the citrus red mite *Panonychus citri*. (2020) (<https://pubmed.ncbi.nlm.nih.gov/32284140>) Main Reference
- Alavijeh ES; Khajehali J; Snoeck S; Panteleri R; Ghadamyari M; Jonckheere W; Bajda S; Saalwaechter C; Geibel S; Douris V; Vontas J; Van Leeuwen T; Dermauw W Authors

**Abstract**

The citrus red mite, *Panonychus citri*, is a major pest on citrus all around the world. Mitochondrial Electron Transport Inhibitors of complex I (METI-I) acaricides such as fenpyroximate have been used extensively to control *P. citri* populations, which resulted in multiple reports of METI-I resistant populations in the field. In this study, biochemical and molecular mechanisms of fenpyroximate resistance were investigated in *P. citri*. Seven populations were collected from Northern provinces of Iran. Resistance ratios were determined and reached up to 75-fold in comparison to a fenpyroximate susceptible population. Cross-resistance to two additional METI-I acaricides, pyridaben and tebufenpyrad, was detected. PBO synergism experiments, in vivo enzyme assays and gene expression analysis suggest a minor involvement of cytochrome P450 monooxygenases in fenpyroximate resistance, which is in contrast with many reported cases for the closely related *Tetranychus urticae*. Next, we determined the frequency of a well-known mutation in the target-site of METI-Is, the PSST subunit, associated with METI-I resistance. Indeed, the H92R substitution was detected in a highly fenpyroximate resistant *P. citri* population. Additionally, a new amino acid substitution at a conserved site in the PSST subunit was detected, A94V, with higher allele frequencies in a moderately resistant population. Marker-assisted back-crossing in a susceptible background confirmed the potential involvement of the newly discovered A94V mutation in fenpyroximate resistance. However, introduction of the A94V mutation in the PSST homologue of *D. melanogaster* using CRISPR-Cas9 did not result in fenpyroximate resistant flies. In addition, differences in binding curves between METI-Is and complex I measured directly, in isolated transgenic and wildtype mitochondria preparations, could not be found.

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Additional References

RELATED GEPHE

- 1 (cytochrome b) ([https://www.gephebase.org/search-criteria?/or+Taxon ID="50023" /and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon ID=)) Related Genes
- No matches found. Related Haplotypes

EXTERNAL LINKS

COMMENTS

