

|                                                                                                                                                                                                                                                                        |                |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|
|                                                                                                                                                                                                                                                                        | Gephebase Gene | GepheID      |
| esterase B1 + esterase A ( <a href="https://www.gepibase.org/search-criteria?/and+Gene+Gepibase=^esterase B1 + esterase A^#gepibase-summary-title">https://www.gepibase.org/search-criteria?/and+Gene+Gepibase=^esterase B1 + esterase A^#gepibase-summary-title</a> ) | GP00000291     |              |
|                                                                                                                                                                                                                                                                        | Entry Status   | Main curator |
| Published                                                                                                                                                                                                                                                              |                |              |

|                                                                                                                                                                                                                                                                                                                                                |                     |                                                                                                                                                                                                                                                                                                                                                |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology^#gephebase-summary-title</a> )                                                                                                               |                     | Trait Category                                                                                                                                                                                                                                                                                                                                 |                     |
| 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                                                                                                                                                                                                                                                                                                                                          |                     |
| Culex pipiens quinquefasciatus - sensitive S-LAB                                                                                                                                                                                                                                                                                               |                     | Trait State in Taxon A                                                                                                                                                                                                                                                                                                                         |                     |
| Culex pipiens quinquefasciatus - resistant Tem-R                                                                                                                                                                                                                                                                                               |                     | Trait State in Taxon B                                                                                                                                                                                                                                                                                                                         |                     |
| Taxon A                                                                                                                                                                                                                                                                                                                                        |                     | Ancestral State                                                                                                                                                                                                                                                                                                                                |                     |
| Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Intraspecific^#gephebase-summary-title</a> )                                                                                                  |                     | Taxonomic Status                                                                                                                                                                                                                                                                                                                               |                     |
| Taxon A                                                                                                                                                                                                                                                                                                                                        |                     | Taxon B                                                                                                                                                                                                                                                                                                                                        |                     |
| Culex quinquefasciatus                                                                                                                                                                                                                                                                                                                         | Latin Name          | Culex quinquefasciatus                                                                                                                                                                                                                                                                                                                         | Latin Name          |
| ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Culex+quinquefasciatus^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Culex quinquefasciatus^#gephebase-summary-title</a> )                                                                                        |                     | ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Culex+quinquefasciatus^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Culex quinquefasciatus^#gephebase-summary-title</a> )                                                                                        |                     |
| southern house mosquito                                                                                                                                                                                                                                                                                                                        | Common Name         | southern house mosquito                                                                                                                                                                                                                                                                                                                        | Common Name         |
| Culex fatigans; Culex pipiens fatigans; Culex pipiens quinquefasciatus; southern house mosquito; Culex fatigan; Culex pipiens quikefasciatus; Culex quinquifasciatus; Culex quinquifasiatus; Culex quikefasciatus                                                                                                                              | Synonyms            | Culex fatigans; Culex pipiens fatigans; Culex pipiens quinquefasciatus; southern house mosquito; Culex fatigan; Culex pipiens quikefasciatus; Culex quinquifasciatus; Culex quinquifasiatus; Culex quikefasciatus                                                                                                                              | Synonyms            |
| species                                                                                                                                                                                                                                                                                                                                        | Rank                | species                                                                                                                                                                                                                                                                                                                                        | Rank                |
| cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Culicini; Culex; Culex; Culex pipiens complex | Lineage             | cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Diptera; Nematocera; Culicomorpha; Culicoidea; Culicidae; Culicinae; Culicini; Culex; Culex; Culex pipiens complex | Lineage             |
| Culex pipiens complex () - (Rank: no rank) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=518105">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=518105</a> )                                                                                                                                             | Parent              | Culex pipiens complex () - (Rank: no rank) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=518105">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=518105</a> )                                                                                                                                             | Parent              |
| 7176 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7176">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7176</a> )                                                                                                                                                                                       | NCBI Taxonomy ID    | 7176 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7176">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7176</a> )                                                                                                                                                                                       | NCBI Taxonomy ID    |
| is Taxon A an Intraspecies?                                                                                                                                                                                                                                                                                                                    |                     | is Taxon B an Intraspecies?                                                                                                                                                                                                                                                                                                                    |                     |
| Yes                                                                                                                                                                                                                                                                                                                                            |                     | Yes                                                                                                                                                                                                                                                                                                                                            |                     |
| Culex pipiens quinquefasciatus - sensitive S-LAB                                                                                                                                                                                                                                                                                               | Taxon A Description | Culex pipiens quinquefasciatus - resistant Tem-R                                                                                                                                                                                                                                                                                               | Taxon B Description |

|                                                                                                                                                                   |                         |                                                                                                                        |                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| B1                                                                                                                                                                | Generic Gene Name       | P16854 ( <a href="http://www.uniprot.org/uniprot/P16854">http://www.uniprot.org/uniprot/P16854</a> )                   | UniProtKB <i>Culex pipiens</i> |
| -                                                                                                                                                                 | Synonyms                | EDS43765 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/EDS43765">https://www.ncbi.nlm.nih.gov/nuccore/EDS43765</a> ) | GenebankID or UniProtKB        |
| -                                                                                                                                                                 | String                  |                                                                                                                        |                                |
|                                                                                                                                                                   | Sequence Similarities   |                                                                                                                        |                                |
| Belongs to the type-B carboxylesterase/lipase family.                                                                                                             |                         |                                                                                                                        |                                |
|                                                                                                                                                                   | GO - Molecular Function |                                                                                                                        |                                |
| GO:0052689 : carboxylic ester hydrolase activity<br>( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0052689">https://www.ebi.ac.uk/QuickGO/term/GO:0052689</a> ) |                         |                                                                                                                        |                                |
|                                                                                                                                                                   | GO - Biological Process |                                                                                                                        |                                |
| -                                                                                                                                                                 | GO - Cellular Component |                                                                                                                        |                                |

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| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Presumptive Null                  |
| No ( <a href="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</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |
| Gene Amplification ( <a href="https://www.gephebase.org/search-criteria?/and+Molecular Type=^Gene Amplification^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Molecular Type=^Gene Amplification^#gephebase-summary-title</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Molecular Type                    |
| Complex Change ( <a href="https://www.gephebase.org/search-criteria?/and+Aberration Type=^Complex Change^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Aberration Type=^Complex Change^#gephebase-summary-title</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Aberration Type                   |
| Amplification of a region containing both genes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Molecular Details of the Mutation |
| Candidate Gene ( <a href="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</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Experimental Evidence             |
| Coamplification of esterase A and B genes as a single unit in <i>Culex pipiens</i> mosquitoes. (1996) ( <a href="https://pubmed.ncbi.nlm.nih.gov/8939022">https://pubmed.ncbi.nlm.nih.gov/8939022</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Main Reference                    |
| Rooker S; Guillemaud T; BergÃ© J; Pasteur N; Raymond M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Authors                           |
| In <i>Culex pipiens</i> mosquitoes, resistance to organophosphorous insecticides often results from increased detoxification by two types of esterases, A and B, which are closely linked. Overproduction of all esterase B so far investigated (B1, B2, B4, B5 and B6) is from gene amplification. An esterase A gene (esterase A2) has recently been cloned from mosquitoes with the overproduced esterases A2 and B2, and amplification of this gene has also been reported. We describe the cDNA sequences of three additional esterase genes from insecticide-resistant strains of <i>Culex pipiens</i> originating from France and California which show at least 93 per cent homology with the esterase A2 gene sequence. Restriction enzyme mapping shows that the esterase A gene lies within 2.2 kb of the esterase B gene. In mosquitoes with overproduced esterases A2 and B2, the amplification level of esterase A is equal to that of esterase B suggesting that the genes are coamplified. Furthermore, we show that in one strain with an overproduced A esterase (A1), gene amplification cannot account for the increased protein level. This indicates that overproduction of esterases A can be achieved through two different mechanisms: gene amplification and a regulatory mechanism--the nature of which remains to be identified. | Abstract                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Additional References             |

### RELATED GEPHE

|                                                                                                                                                                                                                                                                                                                                                                                            |                    |
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| 4 (Cpm1, esterase B1 = esterase beta1, para (kdr), resistance to dieldrin) ( <a href="https://www.gephebase.org/search-criteria?/or+Taxon ID=^7176^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title">https://www.gephebase.org/search-criteria?/or+Taxon ID=^7176^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title</a> ) | Related Genes      |
| No matches found.                                                                                                                                                                                                                                                                                                                                                                          | Related Haplotypes |

### EXTERNAL LINKS

### COMMENTS

Cluster of paralogous genes