GEPHE SUMMARY

Gephebase Gene
foraging (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^foraging^#gephebase-summary-title)

GepheID
GP00002619

Entry Status
Published

Main curator
Courtier

PHENOTYPIC CHANGE

Trait Category
Behavior (https://www.gephebase.org/search-criteria?/and+Trait Category=^Behavior^#gephebase-summary-title)

Trait
Food-search behavior (https://www.gephebase.org/search-criteria?/and+Trait=^Food-search behavior^#gephebase-summary-title)

Trait State in Taxon A
Sesamia nonagrioides - low foraging activity

Trait State in Taxon B
Sesamia nonagrioides - high foraging activity

Ancestral State
Unknown

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Sesamia nonagrioides (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Sesamia nonagrioides^#gephebase-summary-title)

Common Name
Mediterranean corn borer

Synonyms
Mediterranean corn borer; Sesamia nonagroides

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Noctuoidea; Noctuidae; Amphipyrinae; Sesamia

Parent
Sesamia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 134396)

NCBI Taxonomy ID
236805 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 236805)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Sesamia nonagrioides (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Sesamia nonagrioides^#gephebase-summary-title)

Common Name
Mediterranean corn borer

Synonyms
Mediterranean corn borer; Sesamia nonagroides

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Noctuoidea; Noctuidae; Amphipyrinae; Sesamia

Parent
Sesamia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 134396)

NCBI Taxonomy ID
236805 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 236805)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
for

Synonyms
142251_at; anon-WO0140519.260; anon-WO02059370.47; BcDNA:GM08338; CG10033; dg2; Dg2; DG2; Dmel\CG10033; For; FOR/PKG; l(2)06860; PKG; Pkg2; PKG2; Pkg24A; PGK2

String
7227.FBpp0088350 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0088350)

Sequence Similarities
Belongs to the protein kinase superfamily. AGC Ser/Thr protein kinase family. cGMP subfamily.

GO - Molecular Function
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0004674 : protein serine/threonine kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004674)

UniProtKB Drosophila melanogaster
Q03043 (http://www.uniprot.org/uniprot/Q03043)

GenebankID or UniProtKB
()

GO:0030553 : cGMP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0030553)
GO:0004692 : cGMP-dependent protein kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004692)

GO - Biological Process

GO:0007616 : long-term memory (https://www.ebi.ac.uk/QuickGO/term/GO:0007616)
GO:0006468 : protein phosphorylation (https://www.ebi.ac.uk/QuickGO/term/GO:0006468)
GO:0007614 : short-term memory (https://www.ebi.ac.uk/QuickGO/term/GO:0007614)
GO:0008016 : regulation of heart contraction (https://www.ebi.ac.uk/QuickGO/term/GO:0008016)
GO:0030536 : larval feeding behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0030536)
GO:0007631 : feeding behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0007631)
GO:0046959 : habituation (https://www.ebi.ac.uk/QuickGO/term/GO:0046959)
GO:0008345 : larval locomotory behavior (https://www.ebi.ac.uk/QuickGO/term/GO:0008345)
GO:0008045 : motor neuron axon guidance (https://www.ebi.ac.uk/QuickGO/term/GO:0008045)
GO:0030510 : regulation of BMP signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0030510)
GO:0032095 : regulation of response to food (https://www.ebi.ac.uk/QuickGO/term/GO:0032095)
GO:0009744 : response to sucrose (https://www.ebi.ac.uk/QuickGO/term/GO:0009744)

GO - Cellular Component

GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)
GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Association between a coding SNP in foraging gene and foraging activity. But not clear whether the causal mutation is this one.

Experimental Evidence

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

Main Reference

Food searching behaviour of a Lepidoptera pest species is modulated by the foraging gene polymorphism. (2014) (https://pubmed.ncbi.nlm.nih.gov/25274324)

Authors

Chardonnet F; Capdevielle-Dulac C; Chouquet B; Joly N; Harry M; Le Ru B; Silvain JF; Kaiser L

Abstract

The extent of damage to crop plants from pest insects depends on the foraging behaviour of the insect's feeding stage. Little is known, however, about the genetic and molecular bases of foraging behaviour in phytophagous pest insects. The foraging gene (for), a candidate gene encoding a PKG-I, has an evolutionarily conserved function in feeding strategies. Until now, for had never been studied in Lepidoptera, which includes major pest species. The cereal stem borer Sesamia nonagrioides is therefore a relevant species within this order with which to study conservation of and polymorphism in the for gene, and its role in foraging - a behavioural trait that is directly associated with plant injuries. Full sequencing of for cDNA in S. nonagrioides revealed a high degree of conservation with other insect taxa. Activation of PKG by a cGMP analogue increased larval foraging activity, measured by how frequently larvae moved between food patches in an actimeter. We found one non-synonymous allelic variation in a natural population that defined two allelic variants. These variants presented significantly different levels of foraging activity, and the behaviour was positively correlated to gene expression levels. Our results show that for gene function is conserved in this species of Lepidoptera, and describe an original case of a single nucleotide polymorphism associated with foraging behaviour variation in a pest insect. By illustrating how variation in this single gene can predict phenotype, this work opens new perspectives into the evolutionary context of insect adaptation to plants, as well as pest management.

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Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS