

Are fireworms venomous? Evidence for the convergent evolution of toxin homologs in three species of fireworms (Annelida, Amphinomidae).

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Abstract

Amphinomids, more commonly known as fireworms, are a basal lineage of marine annelids characterized by the presence of defensive dorsal calcareous chaetae, which break off upon contact. It has long been hypothesized that amphinomids are venomous and use the chaetae to inject a toxic substance. However, studies investigating fireworm venom from a morphological or molecular perspective are scarce and no venom gland has been identified to date, nor any toxin characterized at the molecular level. To investigate this question, we analyzed the transcriptomes of three species of fireworms—*Eurythoe complanata*, *Hermodice carunculata* and *Paramphinoe jeffreysii*—following a venomomics approach to identify putative venom compounds. Our venomomics pipeline involved *de novo* transcriptome assembly, open reading frame and signal sequence prediction, followed by three different homology search strategies: BLAST, HMMER sequence and HMMER domain. Following this pipeline, we identified 34 clusters of orthologous genes, representing 13 known toxin classes that have been repeatedly recruited into animal venoms. Specifically, the three species share a similar toxin profile with C-type lectins, peptidases, metalloproteinases, spider toxins and CAP proteins found among the most highly expressed toxin homologs. Despite their great diversity, the putative toxins identified are predominantly involved in three

major biological processes: hemostasis, inflammatory response and allergic reactions, all of which are commonly disrupted after fireworm stings. While the putative fireworm toxins identified here need to be further validated, our results strongly suggest that fireworms are venomous animals that use a complex mixture of toxins for defense against predators.

Key words: Annelida, Amphinomidae, fireworms, venom toxins, transcriptomics, venomics

Introduction

Animal venoms, primarily defined as toxic biological secretions produced by one animal and delivered to another through the infliction of a wound, have originated independently in numerous lineages as adaptations for defense, predation and intraspecific competition (Fry et al. 2009; Casewell et al. 2013). Venoms are amongst the most complex biochemical secretions known in nature, but despite this high complexity there is a remarkable degree of convergence in both the molecular scaffolds and the targets of venom components (Gorson et al. 2015; Casewell et al. 2013). A handful of easy to collect well-known venomous organisms such as snakes, spiders or cone snails have been the focus of venom research for decades, and have shaped common hypotheses about venom evolution, such as gene duplication being the main driver of toxin gene evolution (Wong et al. 2012) or venom cocktails being mainly composed of neurotoxic peptides (von Reumont et al. 2014a, 2017). However, the rise of -omics technologies, such as genomics, transcriptomics and proteomics, has led to a revival of venom studies using an integrated approach referred to as venomics. Applying the venomics strategy to elucidate animal venom composition has revealed a high genetic and functional diversity of venom compounds across different taxa, and the molecular processes responsible for it (Vonk et al. 2013; von Reumont et al. 2017; Martinson et al. 2017). Additionally, venomics techniques have been a boon to the study of many taxa that were previously neglected due to their small size, difficulty in collection and/or limited venom

quantities. This increase in taxon diversity in venom research is providing new perspectives and challenging traditional views about venom evolution (Modica et al. 2015; Perkin et al. 2015; Huang et al. 2016; Whelan et al. 2014; von Reumont et al. 2017; Gorson et al. 2015; Martinson et al. 2017). To understand the true diversity of animal venoms and to propose robust hypotheses regarding venom evolution, it is imperative to broaden venom taxon sampling and avoid biases derived from studying a limited pool of venomous organisms.

Annelids are a promising and often neglected group for venomomics research. There are circa 17,000 described annelid species with an extraordinary diversity of body types, life strategies, feeding mechanisms, and striking adaptations (Weigert & Bleidorn 2016). Several annelid lineages use toxins for predation or defense (Figure 1), however apart from the widely studied salivary secretions of the hematophagous leech (Figure 1F) (Amorim et al. 2015; Min et al. 2010; Siddall et al. 2016; Kvist et al. 2014, 2016, 2013) and the potent neurotoxins of glycerid bloodworms (Figure 1E) (von Reumont et al. 2014b; Richter et al. 2017; Bon et al. 1985; Michel & Keil 1975; Thieffry et al. 1982), venom in segmented worms remains largely uncharacterized. Both leeches and bloodworms use venom to assist in feeding. Leeches use several anticoagulants and antihemostatic toxins to prevent coagulation in the host tissue during blood feeding (Kvist et al. 2016) while glycerid bloodworms use a mixture of toxins to capture and immobilize prey (von Reumont et al. 2014b). In addition to the predatory use of venom, there are also annelids that utilize toxins as a defensive mechanism (Figures 1A–D). For example, the earthworm *Eisenia foetida* (Figure 1D) expels its coelomic fluid when threatened, which contains Lysenin, a pore-forming hemolytic protein that is toxic to vertebrates (Kobayashi et al. 2004). Similarly, fireworms (Amphinomidae) (Figures 1A–C) which are common in shallow warm and temperate waters and include colorful reef-dwelling species, are well-known among divers and reef enthusiasts for their painful sting (Wiklund et al. 2008; Ahrens et al. 2013; Barroso et al. 2009; Borda et al. 2012, 2015).

Amphinomidae has been traditionally placed within Errantia (Rouse & Fauchald 1997) until recent molecular studies revealed their phylogenetic position as sister group, together with Sipuncula, to all Pleistoannelida (Sedentaria + Errantia) (Weigert et al. 2014; Andrade et al. 2015; Weigert & Bleidorn

2016). Their revised phylogenetic position suggests that amphinomids are crucial to clarify the basal relationships in the annelid tree of life, and to investigate the origin and evolution of key adaptations such as venom. There are approximately 200 described species and 25 genera of fireworms (Glasby et al. 2000; Rouse & Pleijel 2001) that share a series of morphological apomorphies such as nuchal organs on a sensory structure referred to as the caruncle, a ventral muscular eversible proboscis with thickened cuticle on circular lamellae, and calcareous chaetae (Rouse & Fauchald 1997; Wiklund et al. 2008; Borda et al. 2012). The calcareous chaetae have been hypothesized to function as hypodermic needles that deliver an active toxin, which was identified as a trimethylammonium compound that causes strong skin irritation from the species *Eurythoe complanata*, and was consequently named Complanine (Borda et al. 2012; Nakamura et al. 2008, 2010; von Reumont et al. 2014b). Gustafson (1930) attributed the toxicity of fireworms to a clear gelatinous substance filling the chaetal core, while Schulze et al. (2017) using light microscopy, reported that the chaetal core was hollow and that a small amount of fluid was occasionally released from the tip of the chaeta. Additionally, scanning electron microscopy studies showed that some chaetae are grooved, adding another potential channel for toxin delivery (Schulze et al. 2017). However, to date, no specific secretory glands have been found near the base of the chaetae (Eckert 1985; Schulze et al. 2017). More recently, in their ultrastructural study of *Eurythoe complanata*, Tilic et al. (2017) found no evidence of chaeta functioning as hypodermic needles and suggested that the chaetae are not hollow, but filled with a calcium carbonate matrix that might dissolve leaving a central cavity when exposed to acidic fixatives.

The conflicting evidence regarding the possible function of the calcareous chaetae as a toxin delivery system and the fact that no secretory tissue has been identified near the base of the chaetae has generated doubt about the venomous nature of fireworms (Tilic et al. 2017). Here, we attempt to clarify this question by investigating the transcriptomes of three species of fireworms, *Hermodice carunculata*, *Eurythoe complanata* and *Paramphipome jeffreysii* (Amphinomidae) following a venomomics approach. We identified 34 clusters of orthologous genes that represent 13 distinct toxin classes that have been

convergently recruited into a wide array of animal venoms (Figures 1A–C). Our findings provide compelling evidence that fireworms produce a venomous secretion composed of a diverse cocktail of toxins used for defense against predators, and offer insights into the potential functions of toxin genes in fireworms.

Material and Methods

SAMPLE COLLECTION, RNA EXTRACTION AND SEQUENCING

An individual of *Hermodice carunculata* was collected by SCUBA from Norman's Pond Cay Cave, Norman's Pond Cay, Exumas, Bahamas (GPS N 23 47.181, W 076 08.428) and transported back to the field station where it was flash frozen in liquid nitrogen. A cross section of the posterior end of the animal was dissected for total RNA extraction. The tissue was homogenized in TriZol reagent (Life Technologies, NY) and total RNA was precipitated with isopropanol and dissolved in distilled water. Total RNA was used as template to perform polyA enriched first strand cDNA synthesis using the HiSeq RNA sample preparation kit for Illumina Sequencing (Illumina Inc., San Diego, CA) following manufacturer's instructions. Total RNA and the resulting cDNA library were assessed for quality and concentration with the Agilent 2100 BioAnalyzer and with agarose gel electrophoresis. The cDNA library was sequenced with Illumina HiSeq 1000 using a paired end flow cell and 80 x 2 cycle sequencing at the New York Genome Center (USA). Transcriptomes of *P. jeffreysii* and *E. complanata* were generated as described in Weigert et al. (2014) from RNA extracted from the anterior end for *P. jeffreysii* and from a pool of individuals for *E. complanata*.

RAW READ PROCESSING AND TRANSCRIPTOME ASSEMBLY

Raw reads for *H. carunculata* were visualized and quality checked with FastQC v0.11.5 (www.bioinformatics.babraham.ac.uk). Adapter sequences and low-quality reads were removed using Trimmomatic v0.36 (Bolger et al. 2014) and trimmed reads were re-evaluated with FastQC to ensure the

high quality of the data after the trimming process. Due to the lack of a reference genome, the processed reads were *de novo* assembled using Trinity v2.4.0 (Haas et al. 2013; Grabherr et al. 2011).

Transcriptomes for *E. complanata* and *P. jeffreysii* were generated as described in Weigert et al. (2014).

See supplementary table S1, Supplementary Material online for assembly statistics.

IDENTIFICATION AND ANNOTATION OF PUTATIVE TOXINS

The three *de novo* assembled fireworm transcriptomes were analyzed to identify putative toxins and venom components following a custom *in silico* venomomics pipeline modified from Verdes et al. (2016) (Figure 2). Briefly, TransDecoder v3.0.1 (Haas et al. 2013) was first used to predict protein-coding regions within transcripts. As venom is mainly composed of secreted proteins and peptides, SignalP v4.1 (Petersen et al. 2011) was then used to predict signal peptide sequences in the putative coding regions.

Putative coding regions that included a signal peptide were extracted using a custom Perl script and analyzed following two different homology search strategies, namely sequence similarity searches using the BLASTP tool of the NCBI BLAST v2.6.0 package (Johnson et al. 2008; Altschul 1997) and with HMMER v3.1b2 (Finn et al. 2015; Eddy 2009). Transcripts were searched using the BLASTP tool (Altschul 1997; Johnson et al. 2008) against an in-house database that includes all known toxins available in public databases such as ConoServer (Kaas et al. 2008, 2012) or Tox-Prot (Jungo & Bairoch 2005; Jungo et al. 2012) and additional putative toxins identified by the Holford group. In parallel, transcripts were also searched using HMMER (Finn et al. 2011) against hidden Markov models (HMM) profiles built from alignments of 24 known venom protein classes derived from a recent study of bloodworm (Glyceridae) venom gland transcriptomics (von Reumont et al. 2014b) and from public databases as mentioned above. The HMM profiles were built using complete sequence alignments (HMM sequence) and alignments of specific domain regions of each venom protein class (HMM domain) that had been previously identified with InterProScan v64.0 (Zdobnov & Apweiler 2001; Mulder & Apweiler 2008) in Geneious R10 (Kearse et al. 2012).

Hits with an e-value of $1e^{-5}$ or less derived from each independent search (BLASTP, HMMER sequence, HMMER domain) were considered putative toxins and, after removing redundant sequences, searched against the UniProtKB/Swiss-Prot non-redundant protein sequence database using BLASTP (Altschul 1997; Johnson et al. 2008) for cross validation. Transcripts initially identified as putative toxins were included in the final candidate toxin list only if 1) the best hit from the UniProtKB/Swiss-Prot database had a higher e-value than the initial hit from the venom database or HMM profile, or 2) the best hit from the UniProtKB/Swiss-Prot database was labeled as a toxin. Transcripts initially identified as putative toxins that did not meet these criteria were considered false positives and excluded from downstream analyses. The final databases of candidate toxins for each species were manually curated and orthologous clusters of putative toxins shared by the three species were identified and annotated with OrthoVenn (Wang et al. 2015).

PHYLOGENETIC RECONSTRUCTION OF PUTATIVE TOXINS

Phylogenetic analyses of individual toxin families including amphinomid homologs were performed to validate the orthology predictions derived from the venomics pipeline and to investigate toxin evolutionary relationships and possible origins. Selected putative toxins (i.e. non-redundant contigs that were identified as a toxin by all search methods) and homologous sequences from venomous and non-venomous taxa spanning the Metazoa were downloaded from NCBI GenBank and provided by von Reumont et al (2014b) and aligned with MAFFT v7.310 (Katoh & Standley 2013). The best model of protein evolution for each family was selected with ProtTest 3 (Darriba et al. 2011) and used for phylogenetic tree reconstruction in RAxML-HPC-PTHREADS v8.2.10 (Stamatakis 2006, 2014) with support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. All trees were rooted with non-venomous homologs. See supplementary table S2, Supplementary Material online for accession numbers.

Results and Discussion

DIVERSITY OF FIREWORM TOXIN GENES

Transcriptomic analyses of fireworms, *H. carunculata*, *E. complanata* and *P. jeffreysii*, revealed a wide diversity of putative toxin genes belonging to toxin classes that have been convergently recruited into other animal venoms (Figure 3 and supplementary files S2, S3 and S4, Supplementary Material online). The greatest diversity was found in *E. complanata* with 438 putative toxins representing 30 toxin classes, followed by *H. carunculata* with 261 putative toxins distributed in 24 toxin classes and *P. jeffreysii* with 169 putative toxins representing 22 toxin classes. Although differences in toxin composition are commonly found among different species (Colinet et al. 2013; Barghi et al. 2015; Phuong et al. 2016), the lower diversity of toxin homologs recovered from some species might also be explained by differences in library construction methods and sequencing depth between the three transcriptomes (See supplementary table S1, Supplementary Material online).

The three fireworms share a similar toxin profile, with C-type lectin being the most diverse toxin class in all cases, and peptidase S1, metalloproteinase M12, spider toxin and CAP found among the most highly expressed toxin homologs, altogether representing approximately 60% of all putative toxins identified (Figure 3). Kazal-domain and Kunitz-type protease inhibitors are also among the most diverse toxin homologs expressed in the transcriptomes of *H. carunculata* and *E. complanata* (Figures 3A, B), whereas in *P. jeffreysii* spider neurotoxins including agatoxin, ctenitoxin, hainantoxin and latrotoxin homologs are the second most diverse expressed putative toxins (Figure 3C). The evolutionary relationships among the species identified might explain the higher similarity in the toxin profiles of *H. carunculata* and *E. complanata* and the greater differences with *P. jeffreysii* (Figure 1).

A recent transcriptomic study found a similar profile of toxins expressed in the venom gland of the bloodworm *Glycera dibranchiata* (Annelida, Glyceridae) with peptidase S1 being the most abundant class in this species, and metalloproteinase M12, C-type lectin and CAP found among the most abundantly expressed toxins, adding up to roughly 60% of the overall toxin precursors identified (von Reumont et al. 2014b). In addition, approximately 25% of the putative toxins identified in each of the three species investigated here are homologs of *Glycera* venom compounds (see supplementary files S2,

S3, S4, Supplementary Material online), suggesting that both glycerids and amphinomids have convergently recruited the same protein groups into their toxic secretions, as it has been demonstrated for multiple lineages of venomous animals (Fry et al. 2009).

INTERSPECIFIC VARIATION IN TOXIN COMPOSITION

In addition to the more diverse toxin homologs found in *H. carunculata*, *E. complanata* and *P. jeffreysii* fireworm transcriptomes, a variety of less common but particularly interesting venom toxin-like genes were identified in just one or two of the species, potentially reflecting interspecific variation in toxin composition (Figure 3). Inter- and intraspecific variation in venom composition have been documented as a result of diverse factors such as sex, ontogeny, diet or geographical locality (Cipriani et al. 2017; Sunagar et al. 2014; Colinet et al. 2013; Phuong et al. 2016; Barghi et al. 2015). Therefore, it is reasonable to find differences in toxin composition in the fireworm species investigated here that may not be due to experimental procedures (Figure 1 and supplementary table S1, Supplementary Material online).

The putative species-specific toxins identified include most notably homologs of sea anemone and conoidean mollusk neurotoxins and several cytolytins (Figure 3). Among the neurotoxin homologs, we recovered transcripts with strong sequence similarity to conoidean neurotoxins, including two conotoxin-like peptides in *E. complanata* and four in *P. jeffreysii*, one teretoxin homolog in *H. carunculata* and two in *E. complanata*, and five turrtoxins-like peptides in *E. complanata*. Conoidean venom peptides generally show remarkably high specificity to their molecular target and typically interfere with processes in the nervous system via inhibition of transmembrane ion channels and receptors (Teichert et al. 2015; Leffler et al. 2017). We also identified several cytolytins homologs, including one actinoporin-like transcript from each transcriptome, 4 gigantoxin homologs from *P. jeffreysii*, and one latrotoxin-like peptide from *H. carunculata*. Actinoporin and gigantoxin are highly conserved pore-forming toxins initially identified in sea anemones that show cytolytic, hemolytic and nerve stimulatory activity (Anderluh & Maček 2002; Hu et al. 2011). Gigantoxin also elicits acute pain by interfering with

TRPV1 channels, which are ligand-gated non-selective cation channels expressed in the peripheral sensory neurons and involved in pain sensation (Cuypers et al. 2011). The other putative cytolytic toxin identified is a latarcin-like peptide. Latarcins are antimicrobial and cytolytic peptides from the venom of the spider *Lachesana tarabaei* that adopt an amphiphilic α -helical structure in contact with lipid membranes and show general cytotoxicity and hemolytic activity (Dubovskii et al. 2015; Kozlov et al. 2006).

FUNCTIONAL CATEGORIES AND BIOLOGICAL ACTIVITY OF FIREWORM TOXINS

Identifying the overlap of clusters of orthologous sequences across multiple species allows us to derive hypotheses about the function and evolution of proteins (Wang et al. 2015). The web platform OrthoVenn (Wang et al. 2015) was used to identify and annotate orthologous clusters among the fireworm toxin-like genes and inferred putative functions and biological activities that could explain the physiological symptoms observed after fireworm stings. The total 868 toxin-like genes recovered from the transcriptomes of the three species (438 from *E. complanata*, 261 from *H. carunculata* and 169 from *P. jeffreysii*) (Figure 3) were compared and 34 clusters of orthologous genes (supplementary table S3, Supplementary Material online) that represent 13 distinct toxin classes were identified (Figure 4). For convenience, we classified them into four functional categories: protease inhibitors (cystatin, lipocalin, serpin and kazal-type and kunitz-type protease inhibitors), proteolytic enzymes (metalloproteinase M12, peptidase S1 and peptidase S10), neurotoxins (ShK-like, spider toxins and turriptide-like) and other proteins (CAP, C-type lectins and phospholipases).

Protease inhibitors: cystatin, lipocalin, serpin, kazal domain and kunitz-type protease inhibitors

Cystatins are cysteine-proteinase inhibitors that play important regulatory roles in protein degradation processes (Kordis & Turk 2009). Cystatins have been found in the venoms of several organisms, such as reptiles, caterpillars, ticks, mosquitoes, nematodes and segmented worms (Schwarz et al. 2012; Chmelař et al. 2017; Hartmann & Lucius 2003; Fry et al. 2009; Kvist et al. 2016, 2014; von

Reumont et al. 2014b). In nematodes, cystatins modulate host immune response and can act as proinflammatory molecules whereas tick and leech cystatins are antihemostatic effectors involved in blood feeding (Chmelař et al. 2017; Hartmann & Lucius 2003; Kvist et al. 2016). Twelve cystatin homologs were recovered among the putative fireworm toxins that form an orthologous cluster. The *Eurythoe* and *Paramphinoe* cystatins form a strongly supported clade and are closely related to the *Glycera* bloodworm cystatins and the cnidarian *Cyanea capillata* (Figure 5). The *Hermodice* cystatin-like genes are found elsewhere in the tree more closely related to other cystatins from non-venomous taxa. Interestingly, the *Eurythoe* and *Paramphinoe* putative cystatins do not cluster with other cystatin homologs from non-venomous annelids (*Capitella* and *Perinereis*) suggesting the involvement of this protein in fireworm toxicity.

Lipocalins are small extracellular proteins that bind small hydrophobic molecules and show great functional diversity including roles in retinol and pheromone transport, olfaction, prostaglandin synthesis, cell homeostasis and modulation of the immune response (Flower 1996). Lipocalins have been recruited into a wide variety of animal venoms including vertebrates, such as bats and snakes (Low et al. 2013; Wei & Chen 2012; Junqueira-de-Azevedo et al. 2016), segmented worms (*Glycera*) (von Reumont et al. 2014b) and most notably, it has been independently recruited into the venom and salivary secretions of a variety of hematophagous arthropods such as ticks, kissing bugs and blood feeding dipterans to serve a variety of antihemostatic functions (Fry et al. 2009; Andersen et al. 2005; Santos et al. 2007; Mans et al. 2003; Ribeiro et al. 2007). Lipocalins have also been identified as major allergens inducing severe anaphylactic reactions in humans after hematophagous insect bites (Paddock et al. 2001). Sixteen lipocalin-like genes belonging to two orthologous clusters were identified in the *H. carunculata*, *E. complanata* and *P. jeffreysii* transcriptomes. All putative fireworm lipocalins except one, cluster in a single clade (albeit not supported) that includes Lopap, a lipocalin from the *Lonomia obliqua* caterpillar venom that contributes to hemorrhagic syndrome through prothrombin activation (Figure 6) (Reis et al. 2006).

Serpin homologs were also recovered among the putative fireworm toxins. Serpins are a large and diverse family of protease inhibitors that use a conformational change to irreversibly inhibit serine proteases, although serpins that inhibit caspases and papain-like cysteine proteases have also been identified (Law et al. 2006; Irving et al. 2000). Serpins regulate important proteolytic cascades involved in a variety of biological processes like coagulation, inflammation and immune response (Law et al. 2006). Serpins have been recruited into venoms and toxic secretions of numerous taxa, including vertebrates like male platypus, snakes and frogs (Rokyta et al. 2012; Braud 2000; Wu et al. 2011; Wong et al. 2012), cnidarians (Liu et al. 2015), annelids such as leeches and bloodworms (von Reumont et al. 2014b; Kvist et al. 2014, 2016) and arthropods including remipede crustaceans, caterpillars, parasitoid wasps and blood feeding insects like ticks and mosquitoes (von Reumont et al. 2014c; Veiga et al. 2005; Yan et al. 2017; Chmelař et al. 2017; Kato et al. 2010; Chagas et al. 2013; Poirié et al. 2014). We have identified twelve serpins among the putative fireworm toxins that form a single orthologous cluster. Ten out of the twelve toxins group in one clade in the serpin tree whereas the remaining two are clustered in another clade that includes human, crustacean and parasitoid wasp serpins (supplementary figure S1, Supplementary Material online).

Kazal-type inhibitors are serine protease inhibitors characterized by the presence of one or more Kazal domains, 40-60 amino acid long domains with a conserved structure of six cysteine residues forming three disulfide bridges (Rimphanitchayakit & Tassanakajon 2010; Laskowski & Kato 1980). Kazal-type inhibitors act on a variety of serine proteases including thrombin, trypsin, factor XIIa, subtilisin A, elastase, chymotrypsin and plasmin (Sigle & Ramalho-Ortigão 2013) and have been reported from the venoms of snakes and bats (Francischetti et al. 2013; Fernández et al. 2016; Low et al. 2013), jellyfish (Liu et al. 2015), leeches and bloodworms (Kvist et al. 2014; von Reumont et al. 2014b) and an array of insects including caterpillars, termites, bees, parasitoid wasps, and blood feeding arthropods like ticks, flies and mosquitoes (Negulescu et al. 2015; Kim et al. 2013; Qian et al. 2015; Takác et al. 2006; Veiga et al. 2005; Sigle & Ramalho-Ortigão 2013; Ribeiro et al. 2007). We identified two orthologous clusters of putative fireworm toxins with Kazal domains, one with 3 sequences showing similarity to

kazal-type inhibitors and the other with 4 sequences resembling turripeptides (the latter will be discussed in the neurotoxin section). The putative kazal-type fireworm toxins are found in several clades across the tree, mainly clustering with kazal-type toxins recovered from the venom gland of *Glycera* bloodworms (von Reumont et al. 2014b) (Figure 7). Interestingly, one *Paramphinome* transcript (PJKAZ1) clusters with Vasotab, a kazal-type inhibitor identified from the salivary glands of the horse fly *Hybomitra bimaculata* that functions as a vasodilator (Takác et al. 2006) (Figure 7).

Kunitz-type protease inhibitors were also identified among the putative fireworm toxins. Kunitz-type inhibitors are ubiquitous serine protease inhibitors of approximately 60 amino acids with three conserved disulfide bridges that show inhibitory activity against trypsin, *chymotrypsin*, or both (Wan et al. 2013; Laskowski & Kato 1980). They have been identified from a variety of animal venoms including snakes and frogs (Yuan et al. 2008; Calvete et al. 2007; Wang et al. 2012), leeches and bloodworms (Kvist et al. 2016; von Reumont et al. 2014b), sea anemones and cone snails (Schweitz et al. 1995; Isaeva et al. 2012; Bayrhuber et al. 2005), scorpions and spiders (Ding et al. 2015; Yuan et al. 2008), and a variety of insects like bees, wasps, ticks, flies (Choo et al. 2012; Yang et al. 2009; Soares et al. 2012; Tsujimoto et al. 2012). They contribute to the toxicity of the venom functioning as ion-channel blockers or interfering with physiological processes like blood coagulation, fibrinolysis and inflammation (Wan et al. 2013). One orthologous cluster comprising 5 kunitz-domain sequences was recovered among the putative toxins identified in *H. carunculata*, *E. complanata* and *P. jeffreysii* transcriptomes. The deep structure of the kunitz-type protease inhibitor phylogeny is poorly supported and does not reveal a clear evolutionary pattern (supplementary figure S2, Supplementary Material online). The fireworm kunitz-domain transcripts group with different non-venomous taxa, except for two transcripts that are found in a clade including scorpion venom kunitz-type inhibitors (supplementary figure S2, Supplementary Material online).

Proteolytic enzymes: metalloproteinase M12, peptidase S1 and peptidase S10

The M12 family of zinc dependent metalloproteinases has been widely recruited into the venoms of many taxa including snakes, platypus, scorpions, spiders, cnidarians, cephalopods, mollusks, leeches and bloodworms (Da Silveira et al. 2007; Xia et al. 2013; Kvist et al. 2016; von Reumont et al. 2014b; Wong et al. 2012; Modica et al. 2015) where they interfere with cellular processes inducing various effects such as skin damage, edema, inflammation, hemorrhage, hypotension and necrosis (von Reumont et al. 2014b). Metalloproteinase-like transcripts are among the most diverse putative fireworm toxins identified, with 36 transcripts distributed in 7 orthologous clusters representing both the astacin (M12a) and reprolysin (M12b) subfamilies. The fireworm metalloproteinase-like sequences are distributed in two clades with one including also the astacin-like annelid bloodworm sequences and the other including the reprolysin-like bloodworm sequences (Figure 8).

The S1 family is the largest family of peptidases and includes serine proteases involved in a number of key biological processes, paramount among them are blood coagulation and immune responses (Page & Di Cera 2008). It is one of the most widely recruited venom proteins, recovered from the toxic secretions of a variety of taxa such as, reptiles, shrews, platypuses and vampire bats (Kita et al. 2004; Whittington et al. 2010; Vaiyapuri et al. 2011; Menaldo et al. 2012; Kratzschmar et al. 1991), mollusks, annelids, cephalopods (Ruder et al. 2013; von Reumont et al. 2014b; Modica et al. 2015) and numerous arthropods including centipedes, remipede crustaceans, bees, parasitic wasps, ticks, mosquitoes and caterpillars (Amarant et al. 1991; Xu et al. 2005; Ribeiro et al. 2007; Liu et al. 2012; von Reumont et al. 2014c; Choo et al. 2010; Asgari et al. 2003). In the venom, peptidase S1 serine proteases show varied activities such as anticoagulation, vasodilation, smooth muscle contraction, pain, immunosuppression and inflammation (von Reumont et al. 2014b). Peptidase S1 are among the most diversified class of putative toxins in the fireworm transcriptomes, with 30 transcripts belonging to three orthologous clusters. Most peptidase S1-like genes cluster with bloodworm sequences (supplementary figure S3, Supplementary Material online) and interestingly, a particularly large clade that includes transcripts from all three fireworm species and two *Glycera* species also includes serine proteases identified from the posterior venom glands of the cephalopod *Octopus kaurana* (Fry et al. 2009).

Unlike peptidase S1, the S10 family of serine proteases has not been as widely recruited into animal venoms. Venom serine carboxypeptidases have been found in the venoms of bees (Li et al. 2013), parasitoid wasps (Perkin et al. 2015), assassin bugs (Walker et al. 2017), remipede crustaceans (von Reumont et al. 2017), the giant triton snail (Bose et al. 2017) and glycerid bloodworms (von Reumont et al. 2014b). Venom serine carboxypeptidases have various physiological functions including enhancing the release of histamine, neurotransmitter degradation and neurotoxicity, mediation of immune response and phosphorylation of venom proteins (Li et al. 2013; Bose et al. 2017). S10 peptidases are also recognized allergens of bee venom, inducing strong systemic IgE-mediated allergic reactions (Li et al. 2013). We recovered 20 peptidase S10-like transcripts that represent 3 orthologous clusters among the putative fireworm toxins. All fireworm sequences cluster in one large clade that also includes the bloodworm sequences, which might suggest an annelid specific radiation of this protein class (supplementary figure S4, Supplementary Material online).

Neurotoxins: ShKT, spider toxins and turriptide-like

ShKT-domain containing peptides were recovered from the three fireworm transcriptomes. ShKT-domains were initially discovered from sea anemone peptide toxins, which are potent inhibitors of potassium channels (Castañeda et al. 1995; Castañeda & Harvey 2009) and have been posteriorly reported from a variety of proteins including venom toxins from other cnidarians, snakes, ribbon worms, vampire snails and bloodworms (Modica et al. 2015; von Reumont et al. 2014b; Ponce et al. 2016; Whelan et al. 2014). ShKT domain-containing transcripts are one of the most expressed toxins in the venom glands of the bloodworm *Glycera dibranchiata* (von Reumont et al. 2014b). Most cnidarian ShKT toxins cause paralysis, although some show hemolytic effects (von Reumont et al. 2014b). In the vampire snail *Colubraria reticulata*, ShKT toxins might act as anesthetics (Modica et al. 2015) whereas in *Glycera* bloodworms they are thought to be involved in paralysis and death of prey (von Reumont et al. 2014b). We have identified one orthologous cluster of ShKT-domain toxins including 5 transcripts among the fireworm toxin-like genes. The fireworm ShKT-domain toxins are grouped in a large clade that includes

the bloodworm sequences and the cnidarian toxins (Figure 9). The fireworm ShKT-domain transcripts contain the six conserved cysteines characteristic of this domain and thus are able to form the three disulfide bonds that stabilize sea anemone toxins (Castañeda & Harvey 2009).

We have also identified a variety of spider toxin-like genes in the fireworm transcriptomes, including homologs of agatoxin, atracotoxin, ctenitoxin, hainantoxin and latrotoxin. The majority of these spider toxins are potent neurotoxins that block different voltage-gated potassium, sodium, and calcium ion channels, causing paralysis and severe pain (Kubista et al. 2007; Vassilevski et al. 2009). We recovered one orthologous cluster that includes 9 ctenitoxin-like sequences. Ctenitoxins are neurotoxins that contain an inhibitor cysteine-knot motif, first identified from the venom of the hunting spider *Cupiennius salei* that act as L-type calcium channel inhibitors but also show cytolytic activity (Kuhn-Nentwig et al. 2012; Kubista et al. 2007).

Turriptides are short peptides with conserved cysteine patterns, discovered from the venom of turrids, a diverse group of conoidean mollusks related to cone snails and terebrids (Watkins et al. 2006). Turriptide-like toxins have also been reported from the venom glands of *Glycera* bloodworms, box jellyfish and zoanthids (von Reumont et al. 2014b; Brinkman et al. 2015; Huang et al. 2016). Turriptides function as neurotoxins modulating ion channels and causing disruption of the neuromuscular transmission, which leads to paralysis of prey (Gonzales & Saloma 2014; Aguilar et al. 2009). One orthologous cluster including 4 turriptide-like transcripts with the Kazal-domain characteristic of turriptides was identified among the fireworm putative toxin genes. The turriptide-like toxins have a predicted signal sequence with high sequence identity to that of turriptides and the same conserved cysteine pattern (Figure 10).

Other proteins: C-type lectins, CAP and phospholipases

The superfamily of C-type lectin-like domain (CTLD) proteins is a large group of extracellular proteins with varied functions (Zelensky & Gready 2005) that has been recruited into the venoms of numerous taxa including snakes, stonefish, cnidarians, crustaceans, blood feeding insects, caterpillars,

leeches and bloodworms (Lopes-Ferreira et al. 2011; Magalhães et al. 2006; Morita 2005; Huang et al. 2016; von Reumont et al. 2017; Veiga et al. 2005; Kvist et al. 2016; von Reumont et al. 2014b; Ribeiro et al. 2007). CTLD proteins are the most diverse toxin homolog recovered from the fireworm transcriptomes, with 63 toxins distributed in 9 orthologous clusters revealing a great diversity of paralogs that cluster with *Glycera* bloodworm sequences in several clades across the phylogenetic tree (although many clades are not well supported) (supplementary figure S6, Supplementary Material online). Venom C-type lectins are associated with hemagglutination, hemostasis and inflammatory response (Huang et al. 2016). For example, snake venom CTLD proteins interfere with blood coagulation pathways, whereas those in caterpillar venom have a potent anticoagulant effect and the homologs in blood feeding insects might have an antihemostatic function (Morita 2005; Veiga et al. 2005; Fry et al. 2009).

The CAP protein superfamily includes cysteine-rich secretory proteins (CRISPs), antigen 5 (Ag5) and pathogenesis-related 1 proteins (Pr-1) (Gibbs et al. 2008). CAP proteins have been recruited into the venoms of many taxa including reptiles, bats, monotremes, cnidarians, mollusks, crustaceans, spiders, scorpions, nemertean and bloodworms (von Reumont et al. 2014b; Whelan et al. 2014; Wong et al. 2012; Low et al. 2013; Fry et al. 2009; Moran et al. 2013; von Reumont et al. 2017). In snake venom, CAP proteins function as ion channel modulators inhibiting smooth muscle contraction (Yamazaki & Morita 2004), whereas in cone snails they have proteolytic activity (Milne et al. 2003) and in hymenopteran venoms they represent major allergens (Fang et al. 1988). We have identified 11 CAP homologs that belong to 2 orthologous clusters among the fireworm putative toxins. The fireworm CAP homologs cluster in a clade (although with no support) that includes the rest of the annelid sequences and a few arthropod sequences (supplementary figure S5, Supplementary Material online).

A variety of phospholipase homologs have also been detected among the putative fireworm toxins. Phospholipases catalyze the hydrolysis of phospholipids generating free fatty acids and lysophospholipids, and thus inducing indirect hemolysis (Dennis 1983; Kini 2003). Phospholipases have been convergently recruited into the venoms of reptiles, cnidarians, cephalopods, insects, scorpions, spiders and annelids and they have multiple pharmacological effects including neurotoxicity, cytotoxicity

and myotoxicity (Veiga et al. 2005; King et al. 1996; von Reumont et al. 2014b; Kini 2003; Huang et al. 2016; Nevalainen 2008; Fry et al. 2009). Venom phospholipases can induce necrosis, inflammation, inhibition of blood coagulation and blocking of the neuromuscular transmission (Kini 2003; Fry et al. 2009; Huang et al. 2016). We have recovered 27 phospholipase-like genes that belong to two orthologous clusters, one of them corresponding to phospholipase B homologs and the other including phospholipase A2 homologs. Several of the fireworm phospholipases cluster with *Glycera* bloodworm sequences whereas others form a clade more closely related with snake phospholipases (supplementary figure S7, Supplementary Material online).

EVIDENCE OF THE VENOMOUS NATURE OF FIREWORMS

We have identified a great number and diversity of toxin homologs in the transcriptomes of *E. complanata*, *H. carunculata* and *P. jeffreysii*. However, these transcriptomes are not tissue specific since no venom producing tissue has been yet identified in the fireworms, and therefore distinguishing between putative toxins and related non-toxin homologues is a challenge. Despite this difficulty, we provide several lines of evidence that strongly suggest the sequences we identified here are likely coding for putative toxins. First, It has been shown that gene models predicted to encode toxin-like proteins by similarity searches matched known venom components more likely if they are overexpressed in the venom gland and if their best BLAST hit is a known venom protein (as opposed to another protein from the UniProtKB database) (Rodríguez De La Vega & Giraud 2016). We initially identified putative toxins based on sequence similarity to known toxins and venom proteins, but because this method can also yield non-toxin homologs, we further validated these candidates by comparing them to the entire UniProtKB database. After this second comparison, we filter out the toxin-like transcripts that are more similar to other genes with non-venom related functions. Thus, guaranteeing the best BLAST hit for all our toxin candidates is a known venom protein. Second and importantly, we applied our venomics pipeline to identify putative toxins in the transcriptomes of two related non-venomous annelids (*Chaetopterus* sp. and *Sipunculus nudus*) and a mollusk (*Chiton olivaceus*), recovering only 18 putative toxins in

Chaetopterus sp. and none in *S. nudus* or *C. olivaceus* (see supplementary table S1, Supplementary Material online). We believe the findings in the non-venomous organisms provide validation for the specificity of our pipeline and indicate that most of the sequences identified in the fireworms are more likely coding for venom toxins rather than for non-toxin homologs, suggesting only a minor percentage might represent false positives.

It has been long hypothesized that fireworms are venomous and use their dorsal calcareous chaetae to inject toxins. However, conflicting evidence regarding the function of chaetae as a venom delivery apparatus and the inability to identify glandular tissue near the base of the chaetae has generated some doubts (Tilic et al. 2017; Schulze et al. 2017; Eckert 1985). Tilic et al (2017) concluded that the intrachaetal cavity is artificial and found no evidence of associated venom glands, which led them to suggest that the physiological reactions triggered by fireworm stings result from direct injuries rather than venom injection. Conversely, Schulze et al (2017) found evidence of fluid being released from chaetal tips and identified grooved chaetae under the scanning electron microscope, indicating a possible alternative for toxin delivery. It has also been suggested that fireworms might sequester toxins from their diet, including palytoxin (PTX), the most potent non-protein toxin known, produced by zoanthids and a few other organisms (Gleibs et al. 1995; Schulze et al. 2017; Stoner & Layman 2015). This evidence coupled with the uncertainty of a toxin delivery system may suggest that fireworms could be poisonous. As a consequence, the toxicity of fireworms is unclear and up to date it is still debated whether they are venomous, poisonous or if they are toxic whatsoever.

While the presence of a venom delivery mechanism, which is a clear feature distinguishing venomous versus poisonous animals, has yet to be confirmed in fireworms, other criteria can provide evidence of their venomous nature. These criteria include the specific molecular composition of the toxins, and how the toxins are produced. Venoms tend to be complex proteinaceous mixtures of larger compounds that must be injected into the prey, while poisons are usually composed of small chemical compounds such as alkaloids that can be readily absorbed (Casewell et al. 2013; Daly 1995).

Additionally, most poisonous organisms such as puffer fish, poison dart frogs or birds like the hooded pitohui, sequester the toxins from their diet or from symbiotic microorganisms (Dumbacher et al. 2004; Savitzky et al. 2012). Venomous animals on the contrary, produce venom proteins endogenously by expressing specific gene products (Gorson et al. 2016; Perkin et al. 2015; Fry et al. 2008) that are thought to originate from the neofunctionalization of regular body proteins, such as hormones (Undheim et al. 2015; Fry et al. 2009).

Following these criteria, our findings provide strong evidence supporting that fireworms are venomous organisms that endogenously produce a proteinaceous mixture of peptide toxins and venom protein homologs. Our results show that the species *E. complanata*, *H. carunculata* and *P. jeffreysii* express a wide diversity of transcripts coding for toxin homologs that have been repeatedly recruited into animal venoms, including protease inhibitors, proteolytic enzymes and neurotoxins (Figures 3, 4). For instance, we identified homologs of Kazal-type protease inhibitors, zinc dependent metalloproteinases, and turriptides found in the venoms of a wide diversity of animals spanning the Metazoa, including worms, snails, reptiles, platypuses and vampire bats (Figs. 5-9). The scale and scope of the toxin homologs identified in the transcriptomes of *H. carunculata*, *E. complanata* and *P. jeffreysii* strongly suggests that venom has convergently evolved in fireworms as a defensive mechanism. Additionally, similar to other venomous animals, the toxin homologs found in fireworms appear to have originated through neofunctionalization of body proteins that target major molecular pathways in the circulatory and nervous systems. The putative toxins identified in this study are predominantly involved in three major biological activities: hemostasis, inflammatory response and allergic reactions, all processes that are commonly disrupted after fireworm envenomations (Haddad 2015; Smith 2002; Ottuso 2013) (Figure 4).

Based on the known activities of fireworm toxin homologs in other venomous species, we hypothesize that the diverse cocktail of putative toxins identified here is responsible for the symptoms and physiological reactions observed after fireworm stings. Fireworm stings produce localized reactions with a variety of symptoms that include strong skin inflammation or edema, acute and severe pain, intense

itching, partial paresthesia or numbness of the affected area and sometimes serious wound infections and local necrosis (Smith 2002; Haddad 2015; Schulze et al. 2017; Ottuso 2013; Nakamura et al. 2008). Although rare, there are also reports of systemic reactions including nausea, cardiac and respiratory anaphylactic reactions (Ottuso 2013). The symptoms can last several days or even weeks and the recommended treatment includes applying vinegar and hot water to the affected area (Smith 2002; Schulze et al. 2017), a common remedy for marine envenomations as evidence suggests that heat inactivates key components of the venom (Wilcox & Yanagihara 2016). These symptoms are consistent with the expression of the putative peptide toxins and venom proteins identified in this study.

The numerous protease inhibitors (i.e. cystatin, lipocalin, serpin, kazal and kunitz-type), proteolytic enzymes (metalloproteinase M12 and peptidase S1) and C-type lectins found in *H. carunculata*, *E. complanata* and *P. jeffreysii* fireworms mainly interfere with hemostatic processes and the inflammatory response (Figure 4), and therefore their activities are consistent with the strong skin inflammation, edema and intense pain that occur after fireworm stings. The expression of metalloproteinase M12 and phospholipases could also explain the reported cases of local necrosis. The intense itching and the occasional reports of anaphylactic reactions can be explained by the activities of S10 peptidases and CAP proteins, which are major allergens in hymenopteran venoms. Lastly, the partial paresthesia and numbness reported in the affected area is consistent with the expression of several neurotoxins (ShKT, spider toxins and turriptides) that can cause paralysis, block the neuromuscular transmission or function as anesthetics, and also contribute to the severe pain induced by fireworm stings.

Conclusion

This is the first molecular comparative analysis identifying toxin-like genes in fireworm transcriptomes. Our results show that the fireworm species *H. carunculata*, *E. complanata* and *P. jeffreysii* express a wide diversity of transcripts coding for toxin homologs that represent 13 known toxin classes. These toxins have been convergently recruited into a wide array of animal venoms and their

activities explain the symptoms and physiological reactions observed after fireworm stings. While the debate of whether fireworms use their calcareous dorsal chaetae or an alternative delivery system to inject toxins still remains to be clarified [see Tilic et al. (2017); Schulze et al. (2017)], we provide compelling evidence suggesting that fireworms are venomous animals that use a complex mixture of toxins as a defensive mechanism. The toxin homologs identified in this study represent a valuable resource to further investigate fireworm venom systems and greatly contribute to the venomomics toolkit for deciphering venom diversity and evolution in the animal kingdom.

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Figure Legends

Figure 1. Phylogeny of the family Amphinomidae and venomous annelid representatives.

Phylogenetic tree of the family Amphinomidae with the genera that include the three fireworm species investigated here, highlighted in bold. Cladogram based on phylogenetic reconstruction from Borda et al. (2015). Images of the fireworm species focus of this study are shown to the right: *Paramphinoe jeffreysii* (A); *Eurythoe complanata* (B) and *Hermodice carunculata* (C). Fireworm species are grouped with earthworm (D) *Eisenia foetida* based on their defensive use of toxins and highlighted in yellow. Representatives of species that use venom for predation are also shown, highlighted in blue: bloodworm *Glycera capitata* (E) and leech *Helobdella europaea* (F). Images courtesy of Arne Nygren (A), Denis Riek (B), Arthur Anker (C) and Alexander Semenov (E). Remainder images (F, D) are publicly available under Creative Commons License.

Figure 2. Venomics pipeline for the identification of toxin homologs. Diagram of the bioinformatics pipeline followed to identify putative venom components in fireworms. The different steps are highlighted with colored ovals and the corresponding software used indicated below each step. After RNA extraction and sequencing, the first step is data processing (green) and *de novo* assembly of the transcriptomes. Subsequently, a gene prediction and filtering step (grey) is performed, in which contigs are translated into amino acids, and open reading frames and signal sequences are predicted. The following step is a homology search (blue) using three different search strategies based on BLAST, HMMER-sequence and HMMER-domain. The results are merged and the putative toxins validated (maroon) through BLAST and phylogenetic reconstructions to generate a final list of candidate toxins (yellow).

Figure 3. Diversity of toxin homologs identified in each fireworm species. Pie charts show the diversity of toxin homologs identified in each transcriptome. Toxin homologs are grouped by toxin class and numbers inside the pie chart indicate the relative abundance of each toxin class, as the percentage of the total number of toxins (i.e. 261 in *H. carunculata*, 438 in *E. complanata* and 169 in *P. jeffreysii*). The number of transcripts corresponding to each toxin class is indicated in parenthesis. Abbreviations are as follows: CLEC, C-type lectin; M12, metalloproteinase M12; PEP S1, peptidase S1; PEP S10, peptidase S10; PL, phospholipase; ShK, ShKT-domain containing peptides; AChE, acetylcholinesterase; SMase, sphingomyelinase. Other, groups a variety of less diverse toxin homologs (see supplementary files S2, S3, S4, Supplementary Material online).

Figure 4. Orthologous toxins in fireworms and associated functions. Alluvial diagram showing the 253 orthologous toxins identified in the three fireworm species in the first node, the toxin class to which they belong in the second node, and the associated biological function in the third node. The relative abundance of toxin homologs corresponding to each category (species, toxin class and function) is shown below the name as a percentage of the total. The number of transcripts that correspond to each category is shown in parenthesis. Abbreviations are as follows: CLEC, C-type lectin; M12, metalloproteinase M12; PEP S1, peptidase S1; PEP S10, peptidase S10; PL, phospholipase; ShK, ShKT-domain containing peptides.

Figure 5. Phylogenetic tree of cystatin sequences. Cystatin phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs. Sequences from non-venomous taxa are indicated with closed circles and fireworm homologs are highlighted in bold. Tree reconstructed with RAxML-HPC-PTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes and clade names are indicated by colored squares.

Figure 6. Phylogenetic tree of lipocalin sequences. Lipocalin phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs. Sequences from non-venomous taxa are indicated with closed circles and fireworm homologs are highlighted in bold. Tree reconstructed with RAxML-HPC-PTTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes and clade names are indicated by colored squares.

Figure 7. Phylogenetic tree of Kazal-type protease inhibitors. Kazal-type inhibitor phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs. Sequences from non-venomous taxa are indicated with closed circles and fireworm homologs are highlighted in bold. Tree reconstructed with RAxML-HPC-PTTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes and clade names are indicated by colored squares.

Figure 8. Phylogenetic tree of metalloproteinase M12 sequences. Metalloproteinase M12 phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs. Sequences from non-venomous taxa are indicated with closed circles and fireworm homologs are highlighted in bold. Tree reconstructed with RAxML-HPC-PTTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes and clade names are indicated by colored squares.

Figure 9. Phylogenetic tree of ShKT-domain containing peptides. ShKT-domain containing peptide phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs. Sequences from non-venomous taxa are indicated with closed circles and fireworm homologs are highlighted in bold. Tree reconstructed with RAxML-HPC-PTTHREADS v8.2.10 and support values

estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes and clade names are indicated by colored squares.

Figure 10. Multiple sequence alignment of turriptide-like sequences. Multiple sequence alignment of turriptides and fireworm homologs generated with MAFFT v7.310. Conserved residues are colored, including the conserved cysteines, which are highlighted in yellow. The predicted signal sequence is delimited by a yellow square and the Kazal domain is delineated by a purple square.

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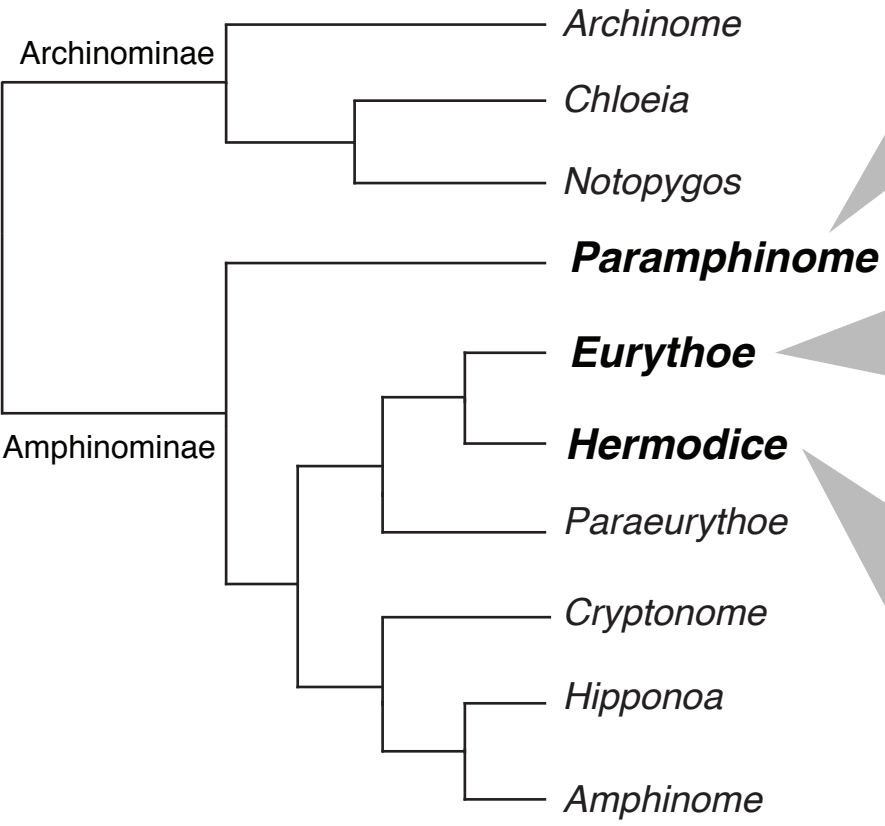
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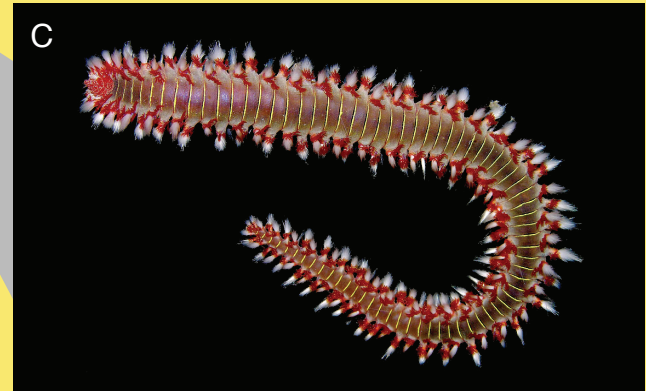
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PREDATION



DEFENSE

Data processing

Raw reads

Illumina HiSeq

Quality Control

FastQC

Trimmomatic

De novo assembly

Trinity

Homology search

BLAST

BLASTp

HMM sequence

HMMER

HMM domain

HMMER

Toxin validation

BLAST

BLASTp

Phylogenetics

MAFFT
RAxML

Candidate
Toxins

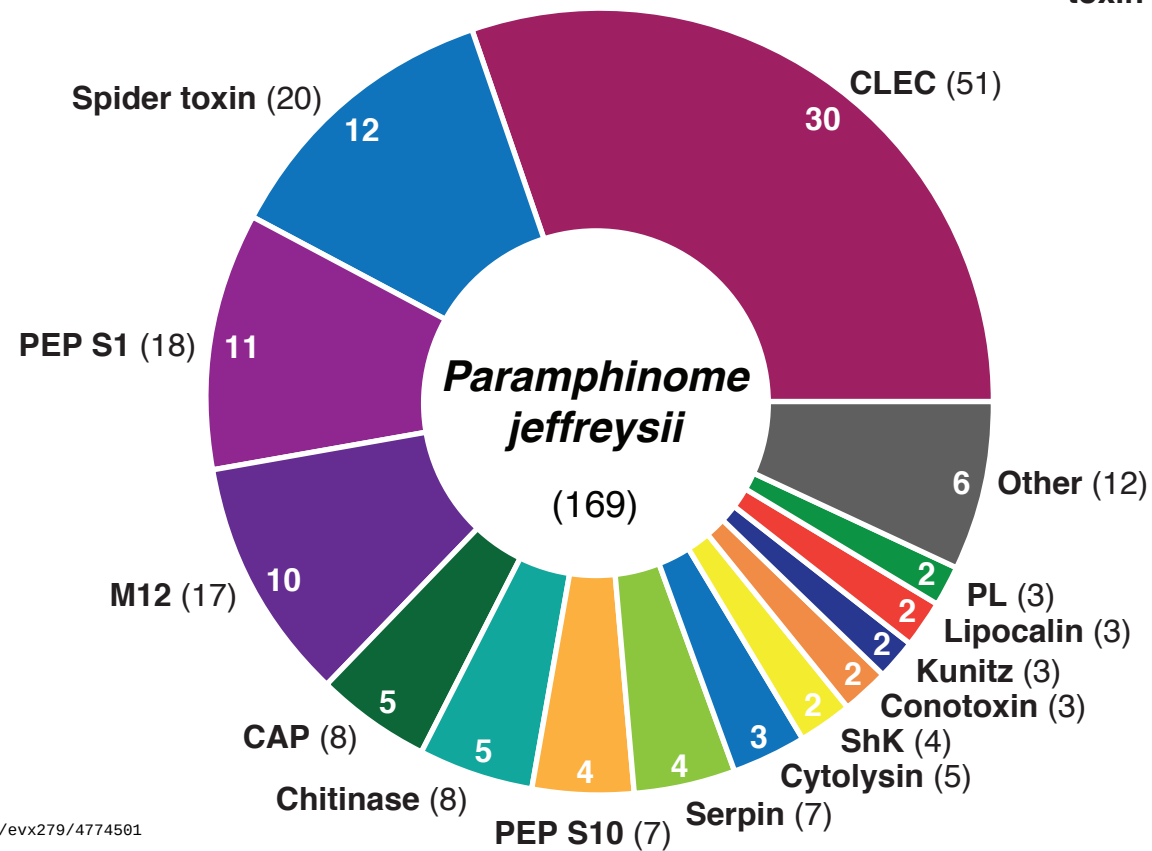
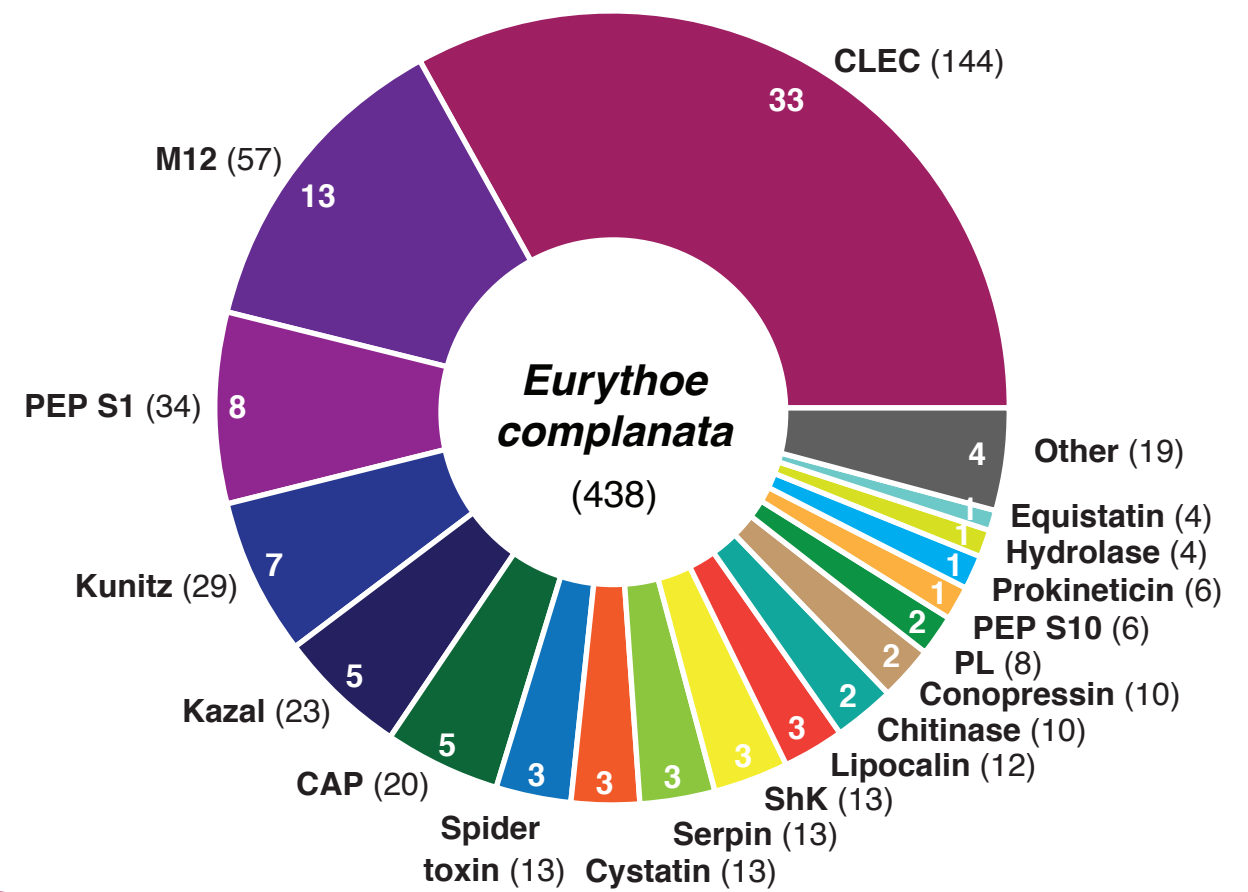
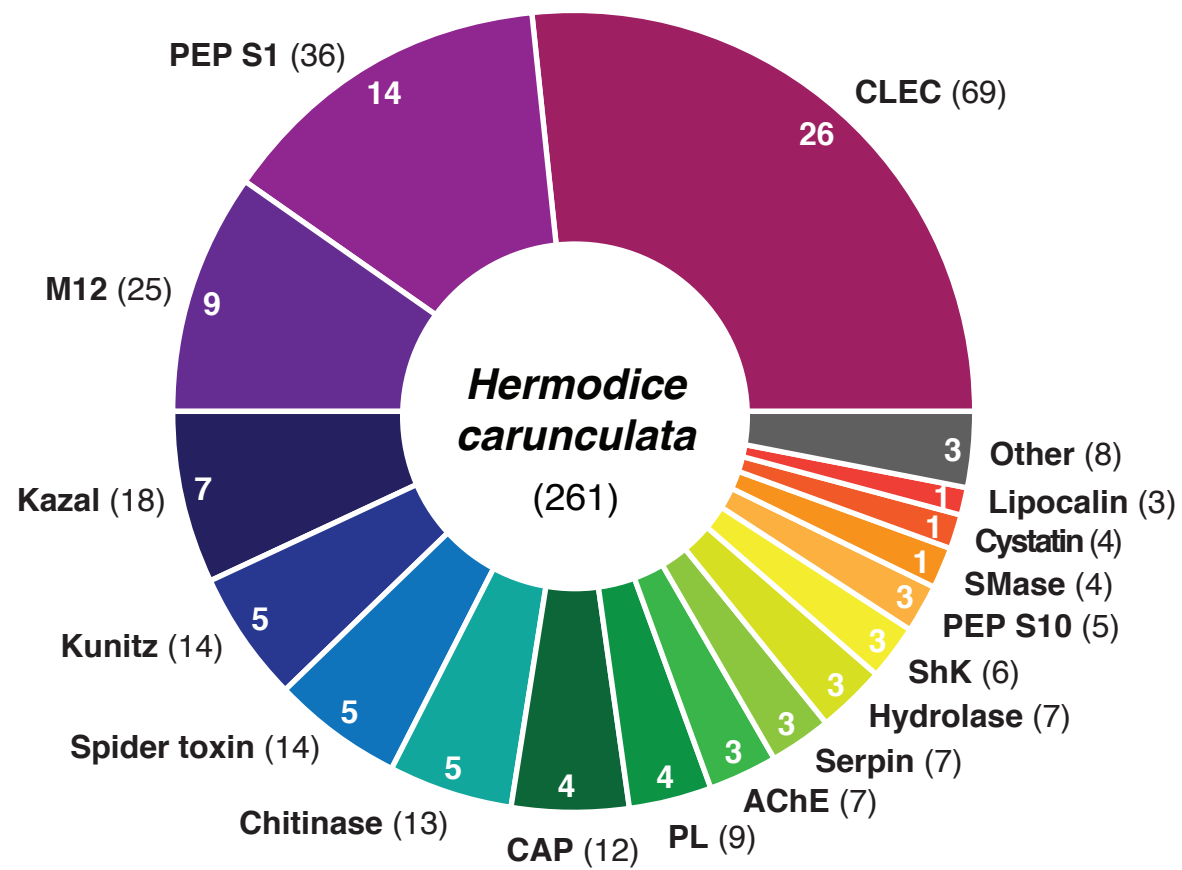
Gene prediction
and filtering

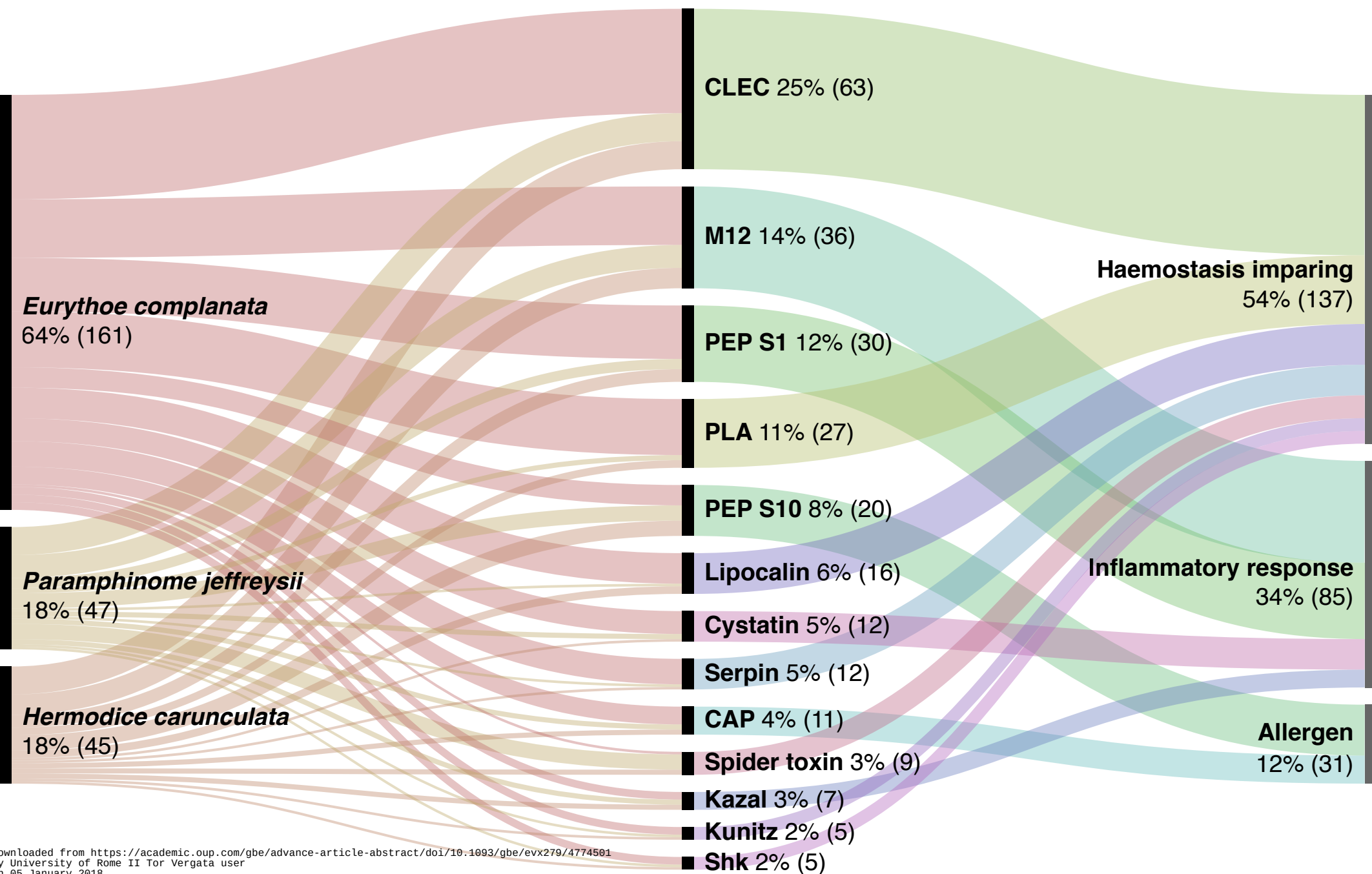
Extract ORFs

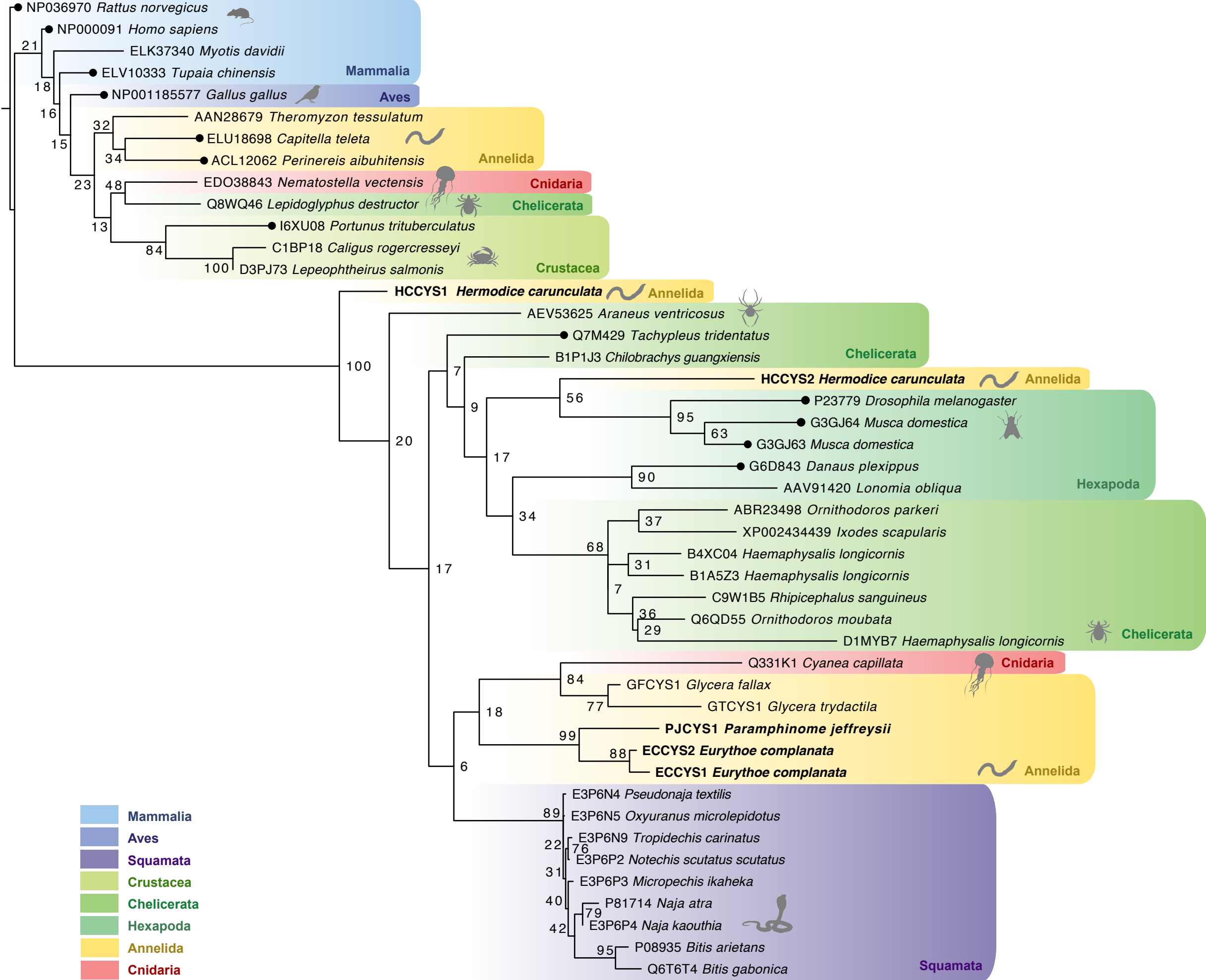
TransDecoder

Predict signal

SignalP

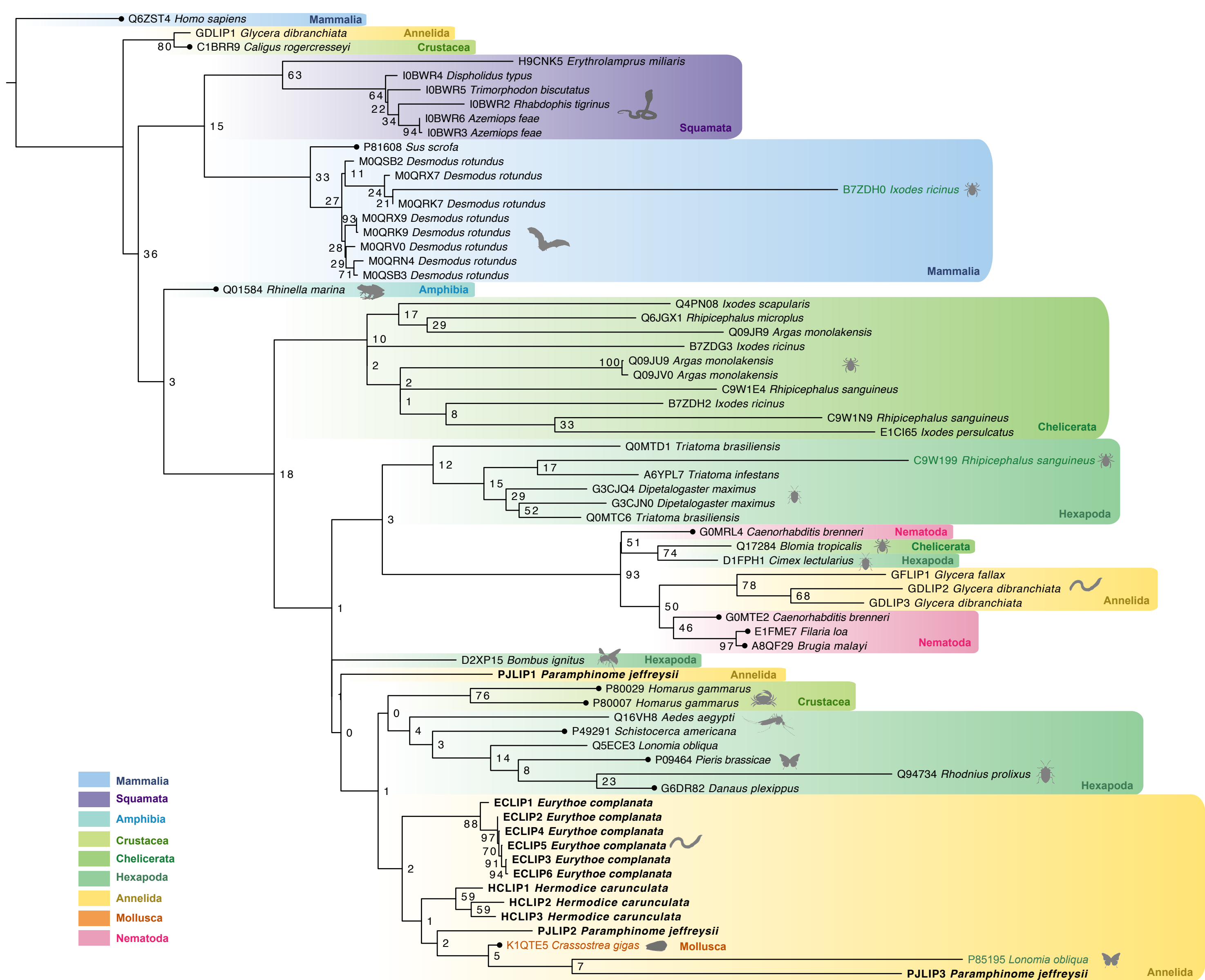


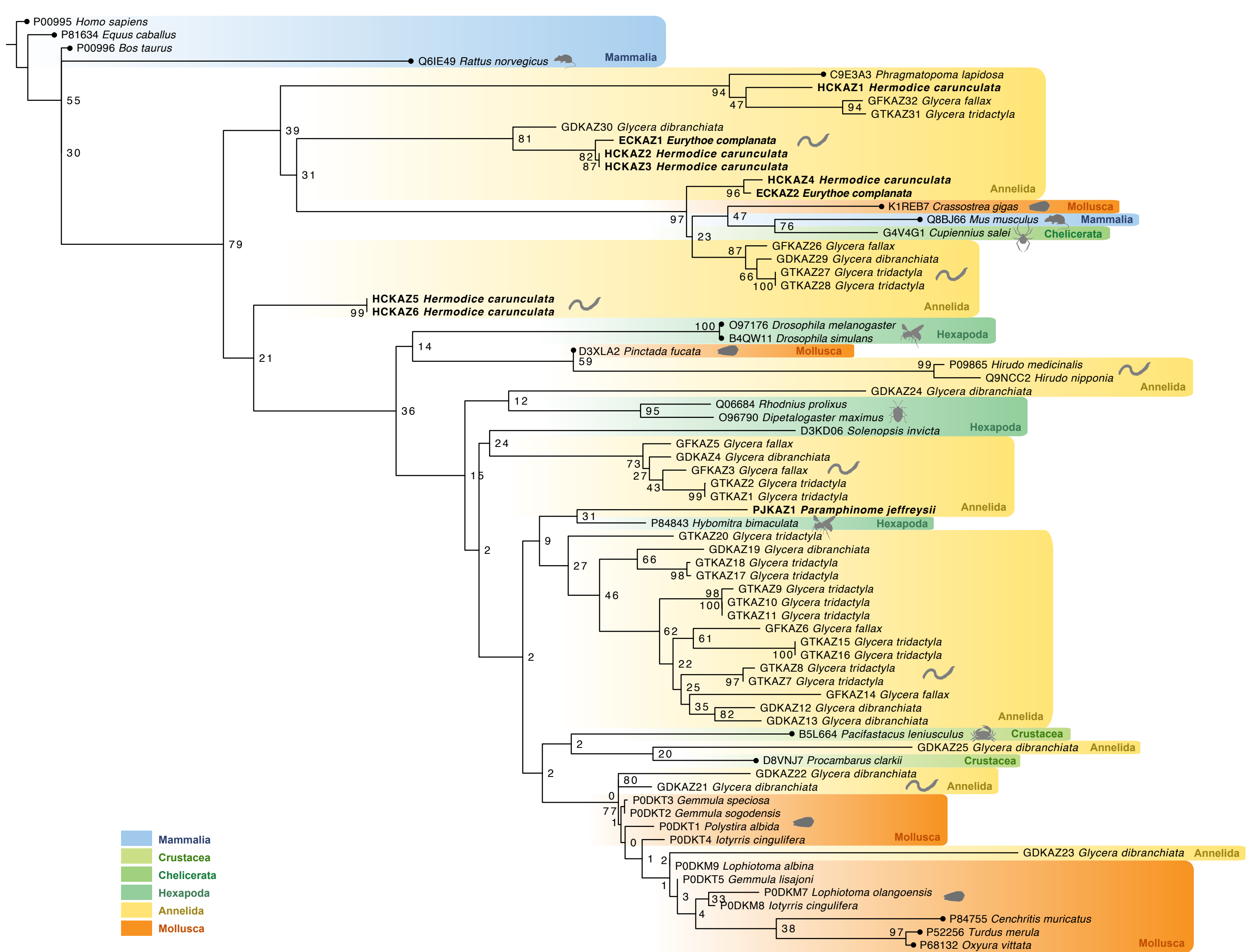


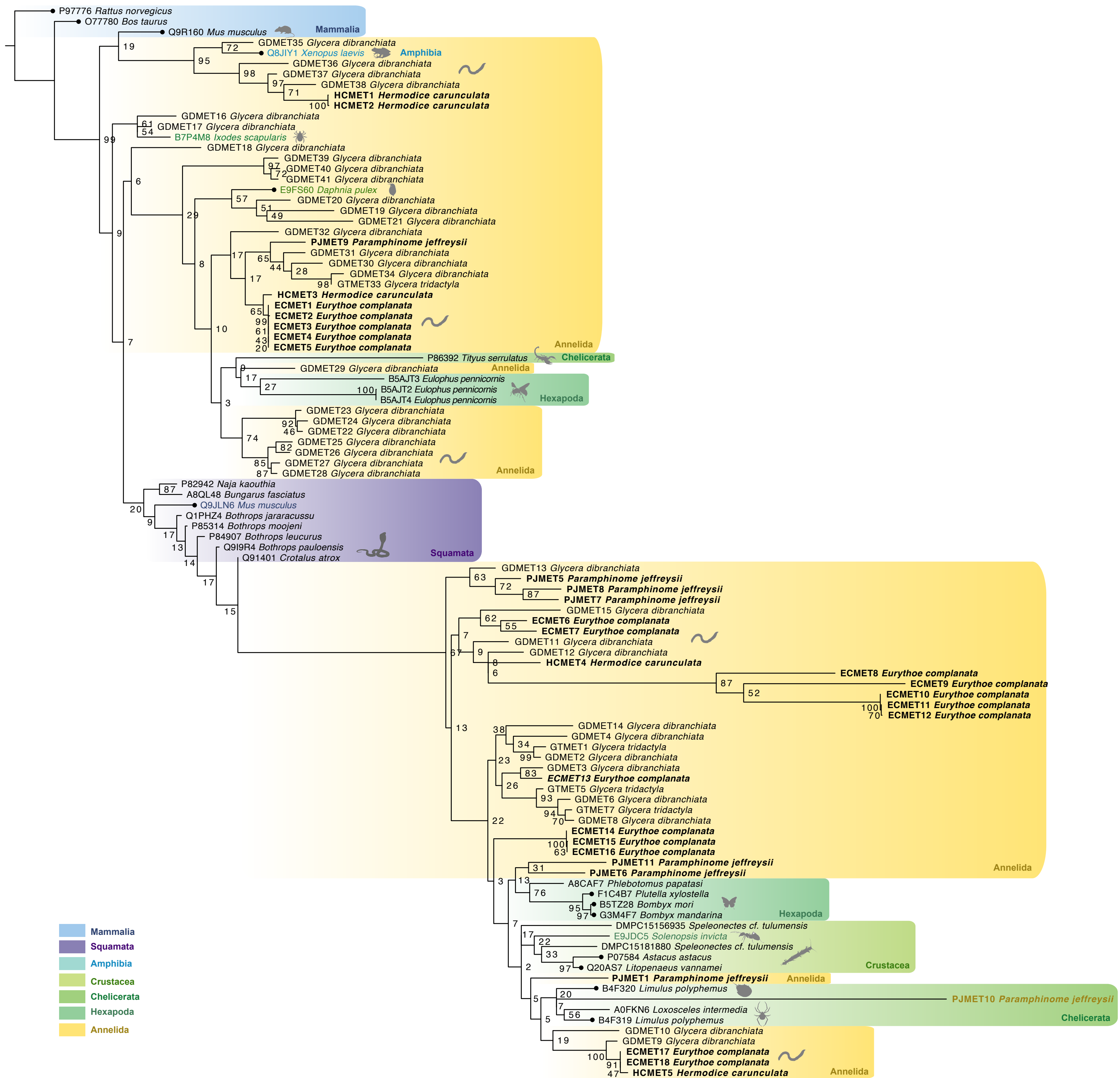


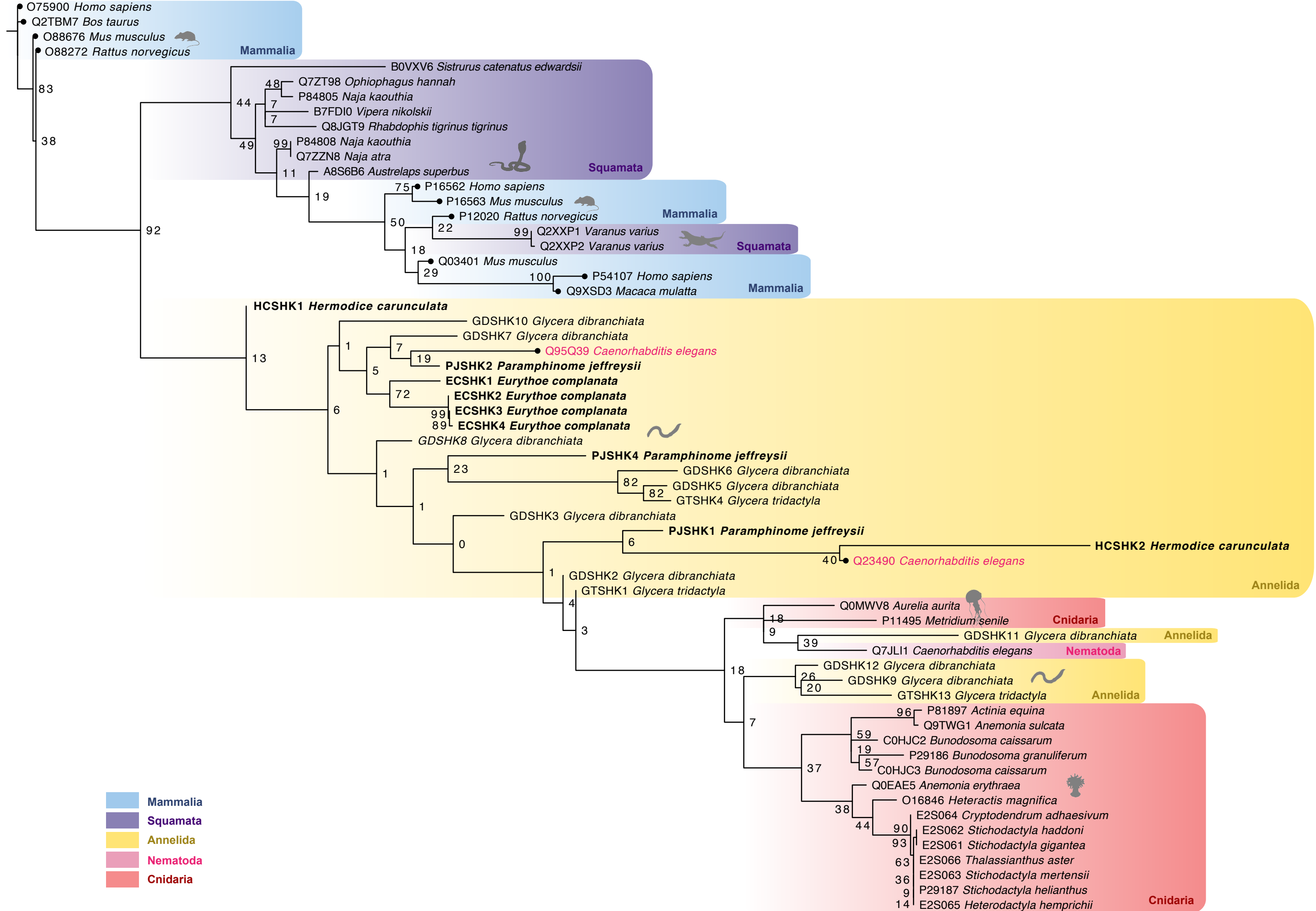
Cystatin

0.7









Supplementary Material online

Are fireworms venomous? Evidence for the convergent evolution of toxin homologs in three species of fireworms (Annelida, Amphinomidae).

Aida Verdes, Danny Simpson and Mandë Holford

Supplementary Material includes:

Supplementary file S1: supplementary tables S1–S3, supplementary figures S1–S7.

Supplementary file S2: toxin homologs identified in *Eurythoe complanata*.

Supplementary file S3: toxin homologs identified in *Hermodice carunculata*.

Supplementary file S4: toxin homologs identified in *Paramphinome jeffreysii*.

Table S1. Sequencing, assembly and venomics pipeline statistics.

	<i>E. complanata</i>	<i>H. carunculata</i>	<i>P. jeffreysii</i>	<i>C. variopedatus</i>	<i>S. nudus</i>	<i>C. olivaceus</i>
SRA run	-	SRR651044	SRR1257731	-	[1]	[1]
Reads	-	213,277,962	39,877,015	42,587,754	45,973,825	46,265,184
Assembly	Velvet/Oases	Trinity	CLC	Trinity	CLC	CLC
Contigs	548,027	308,347	71,866	104,675	71,960	207,559
ORFs	17,129,149	268,692	64,885	110,962	62,475	115,778
SignalP	9,561	6,456	2,030	2,289	0	0
Hits venomDB	611	415	212	118	NA	NA
Putative toxins	438	261	169	18	NA	NA

[1] Riesgo *et al.*, 2012. Comparative description of ten transcriptomes of newly sequenced invertebrates and efficiency estimation of genomic sampling in non-model taxa. *Frontiers in Zoology*, 9: 33. DOI:10.1186/1742-9994-9-33

Table S2. Accession numbers and ID for sequences used in phylogenetic analyses.

Protein	Species	Database	ID
CAP	<i>Acromyrmex echinator</i>	UniProtKB	F4WYD5
CAP	<i>Aedes aegypti</i>	UniProtKB	Q16TE8
CAP	<i>Argas monolakensis</i>	UniProtKB	Q09JX8
CAP	<i>Argas monolakensis</i>	UniProtKB	Q09JS2
CAP	<i>Bombyx mori</i>	UniProtKB	H9JDP7
CAP	<i>Caligus rogercresseyi</i>	UniProtKB	C1BMF7
CAP	<i>Camponotus floridanus</i>	UniProtKB	E2ABL5
CAP	<i>Camponotus floridanus</i>	UniProtKB	E2AXW1
CAP	<i>Cerberus rynchops</i>	UniProtKB	D8VNS1
CAP	<i>Cimex lectularius</i>	UniProtKB	D1FPJ9
CAP	<i>Conus marmoreus</i>	UniProtKB	A1BQQ5
CAP	<i>Conus textile</i>	UniProtKB	Q7YT83
CAP	<i>Ctenocephalides felis</i>	UniProtKB	Q9NH66
CAP	<i>Culex quinquefasciatus</i>	UniProtKB	B0WA83
CAP	<i>Culex quinquefasciatus</i>	UniProtKB	B0WYR5
CAP	<i>Culex quinquefasciatus</i>	UniProtKB	B0WA81
CAP	<i>Culex quinquefasciatus</i>	UniProtKB	B0X6A2
CAP	<i>Culex tarsalis</i>	UniProtKB	B8RJB0
CAP	<i>Daphnia pulex</i>	UniProtKB	E9FY19
CAP	<i>Daphnia pulex</i>	UniProtKB	E9G0Y4
CAP	<i>Dipetalogaster maximus</i>	UniProtKB	G3CJR9
CAP	<i>Dolichovespula arenaria</i>	UniProtKB	Q05108

CAP	<i>Dolichovespula maculata</i>	UniProtKB	P10736
CAP	<i>Dolichovespula maculata</i>	UniProtKB	P10737
CAP	<i>Hapalochlaena maculosa</i>	UniProtKB	B6Z1W7
CAP	<i>Harpegnathos saltator</i>	UniProtKB	E2C0M8
CAP	<i>Heloderma horridum horridum</i>	UniProtKB	Q91055
CAP	<i>Homo sapiens</i>	UniProtKB	P51408
CAP	<i>Homo sapiens</i>	UniProtKB	P54107
CAP	<i>Hottentotta judaicus</i>	UniProtKB	F1CJ75
CAP	<i>Ixodes scapularis</i>	UniProtKB	Q4PN19
CAP	<i>Lycosa singoriensis</i>	UniProtKB	A9QQ26
CAP	<i>Macaca mulatta</i>	UniProtKB	Q9XSD3
CAP	<i>Mus musculus</i>	UniProtKB	Q03402
CAP	<i>Naja atra</i>	UniProtKB	Q7T1K6
CAP	<i>Opisthacanthus cayaporum</i>	UniProtKB	C5J8B3
CAP	<i>Ornithorhynchus anatinus</i>	UniProtKB	F7BG06
CAP	<i>Ornithorhynchus anatinus</i>	UniProtKB	F7BG16
CAP	<i>Pachycondyla chinensis</i>	UniProtKB	C0ITL3
CAP	<i>Phlebotomus duboscqi</i>	UniProtKB	Q06K33
CAP	<i>Polistes annularis</i>	UniProtKB	Q05109
CAP	<i>Polistes dominula</i>	UniProtKB	P81656
CAP	<i>Polistes fuscatus</i>	UniProtKB	P35780
CAP	<i>Polybia paulista</i>	UniProtKB	P86686
CAP	<i>Polybia paulista</i>	UniProtKB	D4P2Y4
CAP	<i>Protobothrops flavoviridis</i>	UniProtKB	Q8JI39
CAP	<i>Rattus norvegicus</i>	UniProtKB	P12020
CAP	<i>Rhabdophis tigrinus tigrinus</i>	UniProtKB	Q8JGT9
CAP	<i>Rhodnius prolixus</i>	UniProtKB	Q7YSZ5
CAP	<i>Rhynchium brunneum</i>	UniProtKB	B2MVK7
CAP	<i>Scolopendra angulata</i>	UniProtKB	P0C8D5
CAP	<i>Scolopendra angulata</i>	UniProtKB	P0C8D4
CAP	<i>Scolopendra viridicornis nigra</i>	UniProtKB	P0C8D7
CAP	<i>Solenopsis invicta</i>	UniProtKB	P35779
CAP	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15197540
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CAP	<i>Stomoxys calcitrans</i>	UniProtKB	Q7Z0B5
CAP	<i>Takifugu rubripes</i>	UniProtKB	H2V7I3
CAP	<i>Takifugu rubripes</i>	UniProtKB	H2SDU2
CAP	<i>Takifugu rubripes</i>	UniProtKB	H2STK1
CAP	<i>Tityus serrulatus</i>	UniProtKB	P85840
CAP	<i>Triatoma infestans</i>	UniProtKB	A6YPK1
CAP	<i>Triatoma matogrossensis</i>	UniProtKB	E2J7I3
CAP	<i>Varanus acanthurus</i>	UniProtKB	Q2XXR1

CAP	<i>Varanus acanthurus</i>	UniProtKB	Q2XXP1
CAP	<i>Vespa crabro</i>	UniProtKB	P35782
CAP	<i>Vespa magnifica</i>	UniProtKB	P86870
CAP	<i>Vespa mandarinia</i>	UniProtKB	P81657
CAP	<i>Vespula germanica</i>	UniProtKB	P35784
CAP	<i>Vespula maculifrons</i>	UniProtKB	Q2L6Z1
CAP	<i>Vespula squamosa</i>	UniProtKB	P35786
CAP	<i>Vespula vulgaris</i>	UniProtKB	Q05110
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CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP9
CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP7
CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP8
CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP4
CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP3
CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP1
CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP2
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CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP13
CAP	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCAP14
CAP	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFCAP1
CAP	<i>Glycera trydactyla</i>	von Reumont <i>et al</i> 2014	GTCAP7
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CAP	<i>Glycera trydactyla</i>	von Reumont <i>et al</i> 2014	GTCAP2
CAP	<i>Eurythoe complanata</i>	This study	ECCAP1
CAP	<i>Eurythoe complanata</i>	This study	ECCAP2
CAP	<i>Hermodice carunculata</i>	This study	HCCAP1
CAP	<i>Hermodice carunculata</i>	This study	HCCAP2
CAP	<i>Paramphinome jeffreysii</i>	This study	PJCAP2
CAP	<i>Paramphinome jeffreysii</i>	This study	PJCAP1
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C-type lectin	<i>Penaeus japonicus</i>	UniProtKB	E2CV66
C-type lectin	<i>Penaeus japonicus</i>	UniProtKB	E2CV62
C-type lectin	<i>Penaeus japonicus</i>	UniProtKB	D7NVW7
C-type lectin	<i>Polyandrocarpa misakiensis</i>	UniProtKB	P16108
C-type lectin	<i>Pseudechis australis</i>	UniProtKB	D2YVI2
C-type lectin	<i>Rhodnius prolixus</i>	UniProtKB	Q7YSZ6
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C-type lectin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15160990
C-type lectin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15150760
C-type lectin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15218669
C-type lectin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15218695
C-type lectin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15196769
C-type lectin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15224971
C-type lectin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15179972
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC34
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC24
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC7
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC30
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC31
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC12
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC9
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC8
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC10
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC13
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC11
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC15
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC19
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC20
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC21
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC32
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC23
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC33
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC25
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC26
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC27
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC28
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC35
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC6
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC4
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC1
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC3
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC2
C-type lectin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDCLEC22
C-type lectin	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFCLEC18
C-type lectin	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFCLEC14
C-type lectin	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFCLEC36

C-type lectin	<i>Glycera trydactila</i>	von Reumont <i>et al</i> 2014	GTCLEC5
C-type lectin	<i>Glycera trydactila</i>	von Reumont <i>et al</i> 2014	GTCLEC16
C-type lectin	<i>Glycera trydactila</i>	von Reumont <i>et al</i> 2014	GTCLEC17
C-type lectin	<i>Glycera trydactila</i>	von Reumont <i>et al</i> 2014	GTCLEC29
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC1
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC2
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC3
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC4
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC5
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC6
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC7
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC8
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC9
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC10
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC11
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC12
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC13
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC14
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC15
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC16
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC17
C-type lectin	<i>Eurythoe complanata</i>	This study	ECCLEC18
C-type lectin	<i>Hermodice carunculata</i>	This study	HCCLEC1
C-type lectin	<i>Hermodice carunculata</i>	This study	HCCLEC2
C-type lectin	<i>Hermodice carunculata</i>	This study	HCCLEC3
C-type lectin	<i>Hermodice carunculata</i>	This study	HCCLEC4
C-type lectin	<i>Paramphinome jeffreysii</i>	This study	PJCLEC3
C-type lectin	<i>Paramphinome jeffreysii</i>	This study	PJCLEC1
C-type lectin	<i>Paramphinome jeffreysii</i>	This study	PJCLEC6
C-type lectin	<i>Paramphinome jeffreysii</i>	This study	PJCLEC5
C-type lectin	<i>Paramphinome jeffreysii</i>	This study	PJCLEC4
C-type lectin	<i>Paramphinome jeffreysii</i>	This study	PJCLEC2
Cystatin	<i>Araneus ventricosus</i>	GenBank	AEV53625
Cystatin	<i>Bitis arietans</i>	UniProtKB	P08935
Cystatin	<i>Bitis gabonica</i>	UniProtKB	Q6T6T4
Cystatin	<i>Caligus rogercresseyi</i>	UniProtKB	C1BP18
Cystatin	<i>Capitella teleta</i>	GenBank	ELU18698
Cystatin	<i>Chilobrachys guangxiensis</i>	UniProtKB	B1P1J3
Cystatin	<i>Cyanea capillata</i>	UniProtKB	Q331K1
Cystatin	<i>Danaus plexippus</i>	UniProtKB	G6D843
Cystatin	<i>Drosophila melanogaster</i>	UniProtKB	P23779
Cystatin	<i>Gallus gallus</i>	GenBank	NP001185577
Cystatin	<i>Haemaphysalis longicornis</i>	UniProtKB	B4XC04
Cystatin	<i>Haemaphysalis longicornis</i>	UniProtKB	B1A5Z3
Cystatin	<i>Haemaphysalis longicornis</i>	UniProtKB	D1MYB7
Cystatin	<i>Homo sapiens</i>	GenBank	NP000091
Cystatin	<i>Ixodes scapularis</i>	GenBank	XP002434439
Cystatin	<i>Lepeophtheirus salmonis</i>	UniProtKB	D3PJ73
Cystatin	<i>Lepidoglyphus destructor</i>	UniProtKB	Q8WQ46
Cystatin	<i>Lonomia obliqua</i>	GenBank	AAV91420
Cystatin	<i>Micropechis ikaheka</i>	UniProtKB	E3P6P3
Cystatin	<i>Musca domestica</i>	UniProtKB	G3GJ64
Cystatin	<i>Musca domestica</i>	UniProtKB	G3GJ63
Cystatin	<i>Myotis davidii</i>	GenBank	ELK37340
Cystatin	<i>Naja atra</i>	UniProtKB	P81714
Cystatin	<i>Naja kaouthia</i>	UniProtKB	E3P6P4
Cystatin	<i>Nematostella vectensis</i>	GenBank	EDO38843
Cystatin	<i>Notechis scutatus scutatus</i>	UniProtKB	E3P6P2
Cystatin	<i>Ornithodoros moubata</i>	UniProtKB	Q6QD55

Cystatin	<i>Ornithodoros parkeri</i>	GenBank	ABR23498
Cystatin	<i>Oxyuranus microlepidotus</i>	UniProtKB	E3P6N5
Cystatin	<i>Perinereis aibuhitensis</i>	GenBank	ACL12062
Cystatin	<i>Portunus trituberculatus</i>	UniProtKB	I6XU08
Cystatin	<i>Pseudonaja textilis</i>	UniProtKB	E3P6N4
Cystatin	<i>Rattus norvegicus</i>	GenBank	NP036970
Cystatin	<i>Rhipicephalus sanguineus</i>	UniProtKB	C9W1B5
Cystatin	<i>Tachypleus tridentatus</i>	UniProtKB	Q7M429
Cystatin	<i>Theromyzon tessulatum</i>	GenBank	AAN28679
Cystatin	<i>Tropidechis carinatus</i>	UniProtKB	E3P6N9
Cystatin	<i>Tupaia chinensis</i>	GenBank	ELV10333
Cystatin	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFCYS1
Cystatin	<i>Glycera trydactyla</i>	von Reumont <i>et al</i> 2014	GTCYS1
Cystatin	<i>Eurythoe complanata</i>	This study	ECCYS1
Cystatin	<i>Eurythoe complanata</i>	This study	ECCYS2
Cystatin	<i>Hermodice carunculata</i>	This study	HCCYS1
Cystatin	<i>Hermodice carunculata</i>	This study	HCCYS2
Cystatin	<i>Paramphinome jeffreysii</i>	This study	PJCYS1
Kazal	<i>Bos taurus</i>	UniProtKB	P00996
Kazal	<i>Cenchrus muricatus</i>	UniProtKB	P84755
Kazal	<i>Crassostrea gigas</i>	UniProtKB	K1REB7
Kazal	<i>Cupiennius salei</i>	UniProtKB	G4V4G1
Kazal	<i>Dipetalogaster maximus</i>	UniProtKB	O96790
Kazal	<i>Drosophila melanogaster</i>	UniProtKB	O97176
Kazal	<i>Drosophila simulans</i>	UniProtKB	B4QW11
Kazal	<i>Equus caballus</i>	UniProtKB	P81634
Kazal	<i>Gemmula lisajoni</i>	UniProtKB	P0DKT5
Kazal	<i>Gemmula sogodensis</i>	UniProtKB	P0DKT2
Kazal	<i>Gemmula speciosa</i>	UniProtKB	P0DKT3
Kazal	<i>Hirudo medicinalis</i>	UniProtKB	P09865
Kazal	<i>Hirudo nipponia</i>	UniProtKB	Q9NCC2
Kazal	<i>Homo sapiens</i>	UniProtKB	P00995
Kazal	<i>Hybomitra bimaculata</i>	UniProtKB	P84843
Kazal	<i>Iotyrris cingulifera</i>	UniProtKB	P0DKT4
Kazal	<i>Iotyrris cingulifera</i>	UniProtKB	P0DKM8
Kazal	<i>Lophiotoma albina</i>	UniProtKB	P0DKM9
Kazal	<i>Lophiotoma olangoensis</i>	UniProtKB	P0DKM7
Kazal	<i>Mus musculus</i>	UniProtKB	Q8BJ66
Kazal	<i>Oxyura vittata</i>	UniProtKB	P68132
Kazal	<i>Pacifastacus leniusculus</i>	UniProtKB	B5L664
Kazal	<i>Phragmatopoma lapidosa</i>	UniProtKB	C9E3A3
Kazal	<i>Pinctada fucata</i>	UniProtKB	D3XLA2
Kazal	<i>Polystira albida</i>	UniProtKB	P0DKT1
Kazal	<i>Procambarus clarkii</i>	UniProtKB	D8VNJ7
Kazal	<i>Rattus norvegicus</i>	UniProtKB	Q6IE49
Kazal	<i>Rhodnius prolixus</i>	UniProtKB	Q06684
Kazal	<i>Solenopsis invicta</i>	UniProtKB	D3KD06
Kazal	<i>Turdus merula</i>	UniProtKB	P52256
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ30
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ29
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ24
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ4
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ19
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ12
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ13
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ25
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ22
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ21
Kazal	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKAZ23

Kazal	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFKAZ32
Kazal	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFKAZ26
Kazal	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFKAZ5
Kazal	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFKAZ3
Kazal	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFKAZ6
Kazal	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFKAZ14
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ31
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ27
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ28
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ2
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ1
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ20
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ18
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ17
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ9
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ10
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ11
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ15
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ16
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ8
Kazal	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTKAZ7
Kazal	<i>Eurythoe complanata</i>	This study	ECKAZ1
Kazal	<i>Eurythoe complanata</i>	This study	ECKAZ2
Kazal	<i>Hermodice carunculata</i>	This study	HCKAZ1
Kazal	<i>Hermodice carunculata</i>	This study	HCKAZ2
Kazal	<i>Hermodice carunculata</i>	This study	HCKAZ3
Kazal	<i>Hermodice carunculata</i>	This study	HCKAZ4
Kazal	<i>Hermodice carunculata</i>	This study	HCKAZ5
Kazal	<i>Hermodice carunculata</i>	This study	HCKAZ6
Kazal	<i>Paramphinome jeffreysii</i>	This study	PJKAZ1
Kunitz	<i>Anemonia sulcata</i>	UniProtKB	P10280
Kunitz	<i>Anemonia sulcata</i>	UniProtKB	Q9TWF9
Kunitz	<i>Anoplius samariensis</i>	UniProtKB	Q589G4
Kunitz	<i>Anthopleura aff. xanthogrammica</i>	UniProtKB	P81547
Kunitz	<i>Araneus ventricosus</i>	UniProtKB	Q8T3S7
Kunitz	<i>Bitis gabonica</i>	UniProtKB	Q6T6S5
Kunitz	<i>Bombyx mori</i>	UniProtKB	P81902
Kunitz	<i>Bombyx mori</i>	UniProtKB	P10831
Kunitz	<i>Bos taurus</i>	UniProtKB	P00974
Kunitz	<i>Bungarus candidus</i>	UniProtKB	Q8AY46
Kunitz	<i>Caretta caretta</i>	UniProtKB	P00993
Kunitz	<i>Conus bullatus</i>	UniProtKB	P0CY85
Kunitz	<i>Conus striatus</i>	UniProtKB	P0C1X2
Kunitz	<i>Culicoides sonorensis</i>	UniProtKB	Q66TW5
Kunitz	<i>Daphnia pulex</i>	UniProtKB	E9GHN6
Kunitz	<i>Daphnia pulex</i>	UniProtKB	E9GHI5
Kunitz	<i>Dendroaspis angusticeps</i>	UniProtKB	P81658
Kunitz	<i>Desmodus rotundus</i>	GenBank	JAA65099
Kunitz	<i>Desmodus rotundus</i>	GenBank	JAA65101
Kunitz	<i>Desmodus rotundus</i>	GenBank	JAA65093
Kunitz	<i>Desmodus rotundus</i>	GenBank	JAA65094
Kunitz	<i>Desmodus rotundus</i>	GenBank	JAA65100
Kunitz	<i>Desmodus rotundus</i>	GenBank	JAA65096
Kunitz	<i>Desmodus rotundus</i>	GenBank	JAA65102
Kunitz	<i>Drosophila virilis</i>	UniProtKB	Q9U5S5
Kunitz	<i>Galleria mellonella</i>	UniProtKB	P81906
Kunitz	<i>Haliotis asinina</i>	UniProtKB	P86733
Kunitz	<i>Haplopelma schmidtii</i>	UniProtKB	P68425
Kunitz	<i>Helix pomatia</i>	UniProtKB	P00994

Kunitz	<i>Hemachatus haemachatus</i>	UniProtKB	P00985
Kunitz	<i>Heteractis crispa</i>	UniProtKB	P16344
Kunitz	<i>Homo sapiens</i>	UniProtKB	P49223
Kunitz	<i>Ixodes scapularis</i>	UniProtKB	Q8MVB4
Kunitz	<i>Ixodes scapularis</i>	UniProtKB	Q4PMJ6
Kunitz	<i>Ixodes scapularis</i>	UniProtKB	B7Q3H2
Kunitz	<i>Latrodectus hesperus</i>	UniProtKB	E7D1X6
Kunitz	<i>Latrodectus hesperus</i>	UniProtKB	E7D1N7
Kunitz	<i>Lepeophtheirus salmonis</i>	UniProtKB	C1BUK1
Kunitz	<i>Lepeophtheirus salmonis</i>	UniProtKB	A7TZ92
Kunitz	<i>Lepeophtheirus salmonis</i>	UniProtKB	D3PI97
Kunitz	<i>Lepeophtheirus salmonis</i>	UniProtKB	D3PGM3
Kunitz	<i>Lychas mucronatus</i>	UniProtKB	P0DJ46
Kunitz	<i>Macaca mulatta</i>	UniProtKB	P29216
Kunitz	<i>Manduca sexta</i>	UniProtKB	P26227
Kunitz	<i>Melithaea caledonica</i>	UniProtKB	P82968
Kunitz	<i>Mesobuthus martensii</i>	UniProtKB	P0C8W3
Kunitz	<i>Mus musculus</i>	UniProtKB	Q9WU03
Kunitz	<i>Naja nivea</i>	UniProtKB	P00986
Kunitz	<i>Neobellieria bullata</i>	UniProtKB	P26228
Kunitz	<i>Oxyuranus scutellatus scutellatus</i>	UniProtKB	B7S4N9
Kunitz	<i>Pimpla hypochondriaca</i>	UniProtKB	Q8T0W4
Kunitz	<i>Pinctada margaritifera</i>	UniProtKB	H2A0N5
Kunitz	<i>Pinctada margaritifera</i>	UniProtKB	H2A0N9
Kunitz	<i>Pinctada margaritifera</i>	UniProtKB	H2A0M2
Kunitz	<i>Pinctada margaritifera</i>	UniProtKB	H2A0N1
Kunitz	<i>Pinctada maxima</i>	UniProtKB	P86964
Kunitz	<i>Pinctada maxima</i>	UniProtKB	P86959
Kunitz	<i>Pseudonaja textilis textilis</i>	UniProtKB	Q90WA0
Kunitz	<i>Rhipicephalus microplus</i>	UniProtKB	Q8WPI2
Kunitz	<i>Rhipicephalus microplus</i>	UniProtKB	P81162
Kunitz	<i>Rhipicephalus sanguineus</i>	UniProtKB	P84554
Kunitz	<i>Sabellastarte magnifica</i>	UniProtKB	P84875
Kunitz	<i>Simulium nigrimanum</i>	UniProtKB	D1FPW8
Kunitz	<i>Solenopsis invicta</i>	UniProtKB	E9IKY9
Kunitz	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15183026
Kunitz	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15257835
Kunitz	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15159087
Kunitz	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15248593
Kunitz	<i>Speleonectes cf. tulumensis</i>	UniProtKB	DMPC15224448
Kunitz	<i>Speleonectes cf. tulumensis</i>	GenBank	isotig00366
Kunitz	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15263476
Kunitz	<i>Stichodactyla helianthus</i>	UniProtKB	P81129
Kunitz	<i>Stichodactyla helianthus</i>	UniProtKB	P31713
Kunitz	<i>Tabanus yao</i>	UniProtKB	C8YJ94
Kunitz	<i>Tachypleus tridentatus</i>	UniProtKB	P16044
Kunitz	<i>Trichosurus vulpecula</i>	UniProtKB	Q29143
Kunitz	<i>Vipera ammodytes ammodytes</i>	UniProtKB	P00992
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN6
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN5
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN4
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN12
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN2
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN11
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN3
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN10
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN9
Kunitz	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDKUN1
Kunitz	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GDKUN7

Kunitz	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GDKUN8
Kunitz	<i>Eurythoe complanata</i>	This study	ECKUN1
Kunitz	<i>Eurythoe complanata</i>	This study	ECKUN2
Kunitz	<i>Eurythoe complanata</i>	This study	ECKUN3
Kunitz	<i>Eurythoe complanata</i>	This study	ECKUN4
Kunitz	<i>Eurythoe complanata</i>	This study	ECKUN5
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN1
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN2
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN3
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN4
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN5
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN6
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN7
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN8
Kunitz	<i>Hermodice carunculata</i>	This study	HCKUN9
Kunitz	<i>Paramphinome jeffreyssi</i>	This study	PJKUN1
Kunitz	<i>Paramphinome jeffreyssi</i>	This study	PJKUN2
Kunitz	<i>Paramphinome jeffreyssi</i>	This study	PJKUN3
Lipocalin	<i>Aedes aegypti</i>	UniProtKB	Q16VH8
Lipocalin	<i>Argas monolakensis</i>	UniProtKB	Q09JR9
Lipocalin	<i>Argas monolakensis</i>	UniProtKB	Q09JU9
Lipocalin	<i>Argas monolakensis</i>	UniProtKB	Q09JV0
Lipocalin	<i>Azemiops feae</i>	UniProtKB	I0BWR6
Lipocalin	<i>Azemiops feae</i>	UniProtKB	I0BWR3
Lipocalin	<i>Blomia tropicalis</i>	UniProtKB	Q17284
Lipocalin	<i>Bombus ignitus</i>	UniProtKB	D2XP15
Lipocalin	<i>Brugia malayi</i>	UniProtKB	A8QF29
Lipocalin	<i>Caenorhabditis brenneri</i>	UniProtKB	G0MTE2
Lipocalin	<i>Caenorhabditis brenneri</i>	UniProtKB	G0MRL4
Lipocalin	<i>Caligus rogercresseyi</i>	UniProtKB	C1BRR9
Lipocalin	<i>Cimex lectularius</i>	UniProtKB	D1FPH1
Lipocalin	<i>Crassostrea gigas</i>	UniProtKB	K1QTE5
Lipocalin	<i>Danaus plexippus</i>	UniProtKB	G6DR82
Lipocalin	<i>Desmodus rotundus</i>	UniProtKB	M0QSB2
Lipocalin	<i>Desmodus rotundus</i>	UniProtKB	M0QRX7
Lipocalin	<i>Desmodus rotundus</i>	UniProtKB	M0QRK7
Lipocalin	<i>Desmodus rotundus</i>	UniProtKB	M0QRX9
Lipocalin	<i>Desmodus rotundus</i>	UniProtKB	M0QRK9
Lipocalin	<i>Desmodus rotundus</i>	UniProtKB	M0QRV0
Lipocalin	<i>Desmodus rotundus</i>	UniProtKB	M0QRN4
Lipocalin	<i>Desmodus rotundus</i>	UniProtKB	M0QSB3
Lipocalin	<i>Dipetalogaster maximus</i>	UniProtKB	G3CJQ4
Lipocalin	<i>Dipetalogaster maximus</i>	UniProtKB	G3CJN0
Lipocalin	<i>Dispholidus typus</i>	UniProtKB	I0BWR4
Lipocalin	<i>Erythrolamprus miliaris</i>	UniProtKB	H9CNK5
Lipocalin	<i>Filaria loa</i>	UniProtKB	E1FME7
Lipocalin	<i>Homarus gammarus</i>	UniProtKB	P80029
Lipocalin	<i>Homarus gammarus</i>	UniProtKB	P80007
Lipocalin	<i>Homo sapiens</i>	UniProtKB	Q6ZST4
Lipocalin	<i>Ixodes persulcatus</i>	UniProtKB	E1CI65
Lipocalin	<i>Ixodes ricinus</i>	UniProtKB	B7ZDH0
Lipocalin	<i>Ixodes ricinus</i>	UniProtKB	B7ZDG3
Lipocalin	<i>Ixodes ricinus</i>	UniProtKB	B7ZDH2
Lipocalin	<i>Ixodes scapularis</i>	UniProtKB	Q4PN08
Lipocalin	<i>Lonomia obliqua</i>	UniProtKB	Q5ECE3
Lipocalin	<i>Lonomia obliqua</i>	UniProtKB	P85195
Lipocalin	<i>Pieris brassicae</i>	UniProtKB	P09464
Lipocalin	<i>Rhabdophis tigrinus</i>	UniProtKB	I0BWR2
Lipocalin	<i>Rhinella marina</i>	UniProtKB	Q01584

Lipocalin	<i>Rhipicephalus microplus</i>	UniProtKB	Q6JGX1
Lipocalin	<i>Rhipicephalus sanguineus</i>	UniProtKB	C9W1E4
Lipocalin	<i>Rhipicephalus sanguineus</i>	UniProtKB	C9W1N9
Lipocalin	<i>Rhipicephalus sanguineus</i>	UniProtKB	C9W199
Lipocalin	<i>Rhodnius prolixus</i>	UniProtKB	Q94734
Lipocalin	<i>Schistocerca americana</i>	UniProtKB	P49291
Lipocalin	<i>Sus scrofa</i>	UniProtKB	P81608
Lipocalin	<i>Triatoma brasiliensis</i>	UniProtKB	Q0MTD1
Lipocalin	<i>Triatoma brasiliensis</i>	UniProtKB	Q0MTC6
Lipocalin	<i>Triatoma infestans</i>	UniProtKB	A6YPL7
Lipocalin	<i>Trimorphodon biscutatus</i>	UniProtKB	I0BWR5
Lipocalin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDLIP1
Lipocalin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDLIP2
Lipocalin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDLIP3
Lipocalin	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFLIP1
Lipocalin	<i>Eurythoe complanata</i>	This study	ECLIP1
Lipocalin	<i>Eurythoe complanata</i>	This study	ECLIP2
Lipocalin	<i>Eurythoe complanata</i>	This study	ECLIP3
Lipocalin	<i>Eurythoe complanata</i>	This study	ECLIP4
Lipocalin	<i>Eurythoe complanata</i>	This study	ECLIP5
Lipocalin	<i>Eurythoe complanata</i>	This study	ECLIP6
Lipocalin	<i>Hermodice carunculata</i>	This study	HCLIP1
Lipocalin	<i>Hermodice carunculata</i>	This study	HCLIP2
Lipocalin	<i>Hermodice carunculata</i>	This study	HCLIP3
Lipocalin	<i>Paramphinoe jeffreysii</i>	This study	PJLIP1
Lipocalin	<i>Paramphinoe jeffreysii</i>	This study	PJLIP2
Lipocalin	<i>Paramphinoe jeffreysii</i>	This study	PJLIP3
M12	<i>Astacus astacus</i>	UniProtKB	P07584
M12	<i>Bombyx mandarina</i>	UniProtKB	G3M4F7
M12	<i>Bombyx mori</i>	UniProtKB	B5TZ28
M12	<i>Bos taurus</i>	UniProtKB	O77780
M12	<i>Bothrops jararacussu</i>	UniProtKB	Q1PHZ4
M12	<i>Bothrops leucurus</i>	UniProtKB	P84907
M12	<i>Bothrops moojeni</i>	UniProtKB	P85314
M12	<i>Bothrops pauloensis</i>	UniProtKB	Q9I9R4
M12	<i>Bungarus fasciatus</i>	UniProtKB	A8QL48
M12	<i>Crotalus atrox</i>	UniProtKB	Q91401
M12	<i>Daphnia pulex</i>	UniProtKB	E9FS60
M12	<i>Eulophus pennicornis</i>	UniProtKB	B5AJT3
M12	<i>Eulophus pennicornis</i>	UniProtKB	B5AJT2
M12	<i>Eulophus pennicornis</i>	UniProtKB	B5AJT4
M12	<i>Ixodes scapularis</i>	UniProtKB	B7P4M8
M12	<i>Limulus polyphemus</i>	UniProtKB	B4F320
M12	<i>Limulus polyphemus</i>	UniProtKB	B4F319
M12	<i>Litopenaeus vannamei</i>	UniProtKB	Q20AS7
M12	<i>Loxosceles intermedia</i>	UniProtKB	A0FKN6
M12	<i>Mus musculus</i>	UniProtKB	Q9JLN6
M12	<i>Naja kaouthia</i>	UniProtKB	P82942
M12	<i>Phlebotomus papatasi</i>	UniProtKB	A8CAF7
M12	<i>Plutella xylostella</i>	UniProtKB	F1C4B7
M12	<i>Rattus norvegicus</i>	UniProtKB	P97776
M12	<i>Solenopsis invicta</i>	UniProtKB	E9JDC5
M12	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15156935
M12	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15181880
M12	<i>Tityus serrulatus</i>	UniProtKB	P86392
M12	<i>Xenopus laevis</i>	UniProtKB	Q8JIY1
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET35
M12	<i>Glycera dibranchiata</i>	Von Reumont <i>et al</i> 2014	GDMET36
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET37

M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET38
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET16
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET17
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET18
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET39
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET40
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET41
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET20
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET19
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET21
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET32
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET31
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET30
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET34
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET29
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET23
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET24
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET22
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET25
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET26
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET27
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET28
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET13
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET15
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET11
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET12
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET14
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET4
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET2
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET3
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET6
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET8
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET10
M12	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDMET9
M12	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTMET33
M12	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTMET1
M12	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTMET5
M12	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTMET7
M12	<i>Eurythoe complanata</i>	This study	ECMET1
M12	<i>Eurythoe complanata</i>	This study	ECMET2
M12	<i>Eurythoe complanata</i>	This study	ECMET3
M12	<i>Eurythoe complanata</i>	This study	ECMET4
M12	<i>Eurythoe complanata</i>	This study	ECMET5
M12	<i>Eurythoe complanata</i>	This study	ECMET6
M12	<i>Eurythoe complanata</i>	This study	ECMET7
M12	<i>Eurythoe complanata</i>	This study	ECMET8
M12	<i>Eurythoe complanata</i>	This study	ECMET9
M12	<i>Eurythoe complanata</i>	This study	ECMET10
M12	<i>Eurythoe complanata</i>	This study	ECMET11
M12	<i>Eurythoe complanata</i>	This study	ECMET12
M12	<i>Eurythoe complanata</i>	This study	ECMET13
M12	<i>Eurythoe complanata</i>	This study	ECMET14
M12	<i>Eurythoe complanata</i>	This study	ECMET15
M12	<i>Eurythoe complanata</i>	This study	ECMET16
M12	<i>Eurythoe complanata</i>	This study	ECMET17
M12	<i>Eurythoe complanata</i>	This study	ECMET18
M12	<i>Hermodice carunculata</i>	This study	HCMET1
M12	<i>Hermodice carunculata</i>	This study	HCMET2
M12	<i>Hermodice carunculata</i>	This study	HCMET3

M12	<i>Hermodice carunculata</i>	This study	HCMET4
M12	<i>Hermodice carunculata</i>	This study	HCMET5
M12	<i>Paramphinome jeffreysii</i>	This study	PJMET9
M12	<i>Paramphinome jeffreysii</i>	This study	PJMET5
M12	<i>Paramphinome jeffreysii</i>	This study	PJMET8
M12	<i>Paramphinome jeffreysii</i>	This study	PJMET7
M12	<i>Paramphinome jeffreysii</i>	This study	PJMET11
M12	<i>Paramphinome jeffreysii</i>	This study	PJMET6
M12	<i>Paramphinome jeffreysii</i>	This study	PJMET1
M12	<i>Paramphinome jeffreysii</i>	This study	PJMET10
PLA	<i>Adamsia palliata</i>	UniPortKB	Q8WS88
PLA	<i>Apis cerana cerana</i>	UniPortKB	Q9BMK4
PLA	<i>Apis dorsata</i>	UniPortKB	Q7M4I5
PLA	<i>Apis mellifera</i>	UniPortKB	P00630
PLA	<i>Argas monolakensis</i>	UniPortKB	Q09JM7
PLA	<i>Bombus terrestris</i>	UniPortKB	P82971
PLA	<i>Bungarus multicinctus</i>	UniPortKB	P00606
PLA	<i>Bunodosoma caissarum</i>	UniPortKB	P86780
PLA	<i>Cerrophidion godmani</i>	UniPortKB	P81165
PLA	<i>Condylactis gigantea</i>	UniPortKB	D2X8K2
PLA	<i>Crassostrea gigas</i>	UniPortKB	K1P7E6
PLA	<i>Crotalus atrox</i>	UniPortKB	P00624
PLA	<i>Culex quinquefasciatus</i>	UniPortKB	B0W2R2
PLA	<i>Deinagkistrodon acutus</i>	UniPortKB	Q7SID6
PLA	<i>Gloydus halys</i>	UniPortKB	P14418
PLA	<i>Hadrurus gertschi</i>	UniPortKB	P0C8L9
PLA	<i>Homo sapiens</i>	UniPortKB	P04054
PLA	<i>Laticauda semifasciata</i>	UniPortKB	P00611
PLA	<i>Mesobuthus tamulus</i>	UniPortKB	Q6T178
PLA	<i>Micrurus altirostris</i>	UniPortKB	F5CPF0
PLA	<i>Naja atra</i>	UniPortKB	P00598
PLA	<i>Ornithodoros coriaceus</i>	UniPortKB	B2D2F9
PLA	<i>Pandinus imperator</i>	UniPortKB	P59888
PLA	<i>Pandinus imperator</i>	UniPortKB	P0DKU2
PLA	<i>Protophrops flavoviridis</i>	UniPortKB	P06859
PLA	<i>Rattus norvegicus</i>	UniPortKB	P14423
PLA	<i>Scolopendra viridis</i>	UniPortKB	C1JAR9
PLA	<i>Sepia latimanus</i>	UniPortKB	B6Z1Y5
PLA	<i>Tribolium castaneum</i>	UniPortKB	C0LTQ1
PLA	<i>Urticina crassicornis</i>	UniPortKB	A7LCJ2
PLA	<i>Xenopus laevis</i>	UniPortKB	P41485
PLA	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPLA5
PLA	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPLA2
PLA	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPLA1
PLA	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPLA1
PLA	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPLA2
PLA	<i>Eurythoe complanata</i>	This study	ECPLA1
PLA	<i>Eurythoe complanata</i>	This study	ECPLA2
PLA	<i>Eurythoe complanata</i>	This study	ECPLA3
PLA	<i>Hermodice carunculata</i>	This study	HCPLA1
PLA	<i>Hermodice carunculata</i>	This study	HCPLA2
PLA	<i>Hermodice carunculata</i>	This study	HCPLA3
PLA	<i>Hermodice carunculata</i>	This study	HCPLA4
PLA	<i>Hermodice carunculata</i>	This study	HCPLA5
PLA	<i>Hermodice carunculata</i>	This study	HCPLA6
PLA	<i>Hermodice carunculata</i>	This study	HCPLA7
PLA	<i>Paramphinome jeffreysii</i>	This study	PJPLA3
PLA	<i>Paramphinome jeffreysii</i>	This study	PJPLA1
PLA	<i>Paramphinome jeffreysii</i>	This study	PJPLA2

PS1	<i>Anolis carolinensis</i>	GenBank	XP_003221647
PS1	<i>Apis mellifera</i>	UniProtKB	Q8MQS8
PS1	<i>Bitis gabonica</i>	UniProtKB	Q6T6S7
PS1	<i>Blarina brevicauda</i>	UniProtKB	Q76B45
PS1	<i>Blarina brevicauda</i>	UniProtKB	Q5FBW2
PS1	<i>Blarina brevicauda</i>	UniProtKB	Q5FBW2
PS1	<i>Bombus pensylvanicus</i>	UniProtKB	Q7M4I3
PS1	<i>Bombus terrestris</i>	GenBank	XP_003397614
PS1	<i>Bothrops jararaca</i>	UniProtKB	Q9PTU8
PS1	<i>Canis lupus familiaris</i>	UniProtKB	Q29474
PS1	<i>Cavia porcellus</i>	GenBank	XP_003469210
PS1	<i>Daphnia pulex</i>	GenBank	EFX70866
PS1	<i>Drosophila melanogaster</i>	UniProtKB	P05049
PS1	<i>Drosophila mojavensis</i>	UniProtKB	B4KLE8
PS1	<i>Drosophila virilis</i>	GenBank	XP_002052132
PS1	<i>Harpegnathos saltator</i>	GenBank	EFN86145
PS1	<i>Harpegnathos saltator</i>	GenBank	EFN88016
PS1	<i>Heloderma horridum</i>	GenBank	AAB28515
PS1	<i>Heloderma horridum horridum</i>	UniProtKB	P43685
PS1	<i>Homo sapiens</i>	UniProtKB	P06870
PS1	<i>Hydrophis hardwickii</i>	UniProtKB	Q5MCS0
PS1	<i>Ixodes scapularis</i>	GenBank	XP_002435839
PS1	<i>Lachesis muta muta</i>	UniProtKB	P33589
PS1	<i>Macaca fascicularis</i>	UniProtKB	Q07276
PS1	<i>Megachile rotundata</i>	GenBank	XP_003704850
PS1	<i>Nasonia vitripennis</i>	GenBank	XP_001602600
PS1	<i>Octopus kaurana</i>	GenBank	ACJ22649
PS1	<i>Octopus kaurana</i>	GenBank	ACJ22645
PS1	<i>Oryzias latipes</i>	GenBank	XP_004071170
PS1	<i>Papio anubis</i>	GenBank	XP_003899480
PS1	<i>Polistes dominula</i>	UniProtKB	Q7Z269
PS1	<i>Rattus norvegicus</i>	GenBank	NP_036857
PS1	<i>Scolopendra subspinipes</i>	GenBank	74764952
PS1	<i>Scolopendra subspinipes</i>	UniProtKB	O96900
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15203147
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15153251
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	isotig00513
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15205911
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15179801
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	isotig00159
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	isotig00346
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	isotig00882
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	isotig00478
PS1	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15242008
PS1	<i>Sus scrofa</i>	GenBank	NP_999239
PS1	<i>Varanus acanthurus</i>	UniProtKB	Q2XXN3
PS1	<i>Varanus mitchelli</i>	UniProtKB	Q2XXN0
PS1	<i>Varanus panoptes rubidus</i>	UniProtKB	Q2XXM0
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.108
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.109
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.111
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.112
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.24
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.40
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.14
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.74
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.73
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.18
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.41

[illegible]

PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.99
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.97
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.98
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.96
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.95
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.93
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.110
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.72
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.71
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.75
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.107
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.104
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.102
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.100
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.101
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.106
PS1	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS1.105
PS1	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFPS1.22
PS1	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFPS1.37
PS1	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFPS1.23
PS1	<i>Glycera fallax</i>	von Reumont <i>et al</i> 2014	GFPS1.69
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.20
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.19
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.21
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.28
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.29
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.30
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.34
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.88
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.90
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.91
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.76
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.77
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.78
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.66
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GDPS1.51
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GDPS1.67
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.13
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.2
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.1
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.7
PS1	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS1.103
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.1
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.2
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.3
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.4
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.5
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.6
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.7
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.8
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.9
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.10
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.11
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.12
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.13
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.14
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.15
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.16
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.17

PS1	<i>Eurythoe complanata</i>	This study	ECPS1.18
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.19
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.20
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.21
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.22
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.23
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.24
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.25
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.26
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.27
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.28
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.29
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.30
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.31
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.32
PS1	<i>Eurythoe complanata</i>	This study	ECPS1.33
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.1
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.2
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.3
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.4
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.5
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.6
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.7
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.8
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.9
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.10
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.11
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.12
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.13
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.14
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.15
PS1	<i>Hermodice carunculata</i>	This study	HCPS1.16
PS1	<i>Paramphinome jeffreysii</i>	This study	PJPS1.2
PS1	<i>Paramphinome jeffreysii</i>	This study	PJPS1.3
PS1	<i>Paramphinome jeffreysii</i>	This study	PJPS1.4
PS1	<i>Paramphinome jeffreysii</i>	This study	PJPS1.1
PS10	<i>Acromyrmex echinator</i>	UniProtKB	F4X0L6
PS10	<i>Acyrtosiphon pisum</i>	UniProtKB	J9JIP5
PS10	<i>Aedes aegypti</i>	UniProtKB	Q16W90
PS10	<i>Aedes aegypti</i>	UniProtKB	Q175U3
PS10	<i>Aedes aegypti</i>	UniProtKB	P42660
PS10	<i>Ailuropoda melanoleuca</i>	UniProtKB	D2GVB0
PS10	<i>Anolis carolinensis</i>	UniProtKB	H9GCB0
PS10	<i>Anopheles darlingi</i>	UniProtKB	E3WWF6
PS10	<i>Anopheles gambiae</i>	UniProtKB	Q7QJG6
PS10	<i>Apis mellifera</i>	UniProtKB	C9WMM5
PS10	<i>Atta cephalotes</i>	UniProtKB	H9HTW7
PS10	<i>Bombyx mori</i>	UniProtKB	H9JTB1
PS10	<i>Caligus rogercresseyi</i>	UniProtKB	C1BPZ3
PS10	<i>Callithrix jacchus</i>	UniProtKB	F7HLR8
PS10	<i>Camponotus floridanus</i>	UniProtKB	E2AY00
PS10	<i>Crassostrea gigas</i>	UniProtKB	K1Q7K0
PS10	<i>Crotalus adamanteus</i>	UniProtKB	J3SE72
PS10	<i>Culex quinquefasciatus</i>	UniProtKB	B0WNR6
PS10	<i>Culex quinquefasciatus</i>	UniProtKB	B0WT67
PS10	<i>Danaus plexippus</i>	UniProtKB	G6CI99
PS10	<i>Danio rerio</i>	UniProtKB	Q7ZU43
PS10	<i>Eriocheir sinensis</i>	UniProtKB	E3TGS7
PS10	<i>Haplochromis burtoni</i>	UniProtKB	A8DSV5

PS10	<i>Harpegnathos saltator</i>	UniProtKB	E2BR37
PS10	<i>Homo sapiens</i>	UniProtKB	B3KW79
PS10	<i>Ixodes scapularis</i>	UniProtKB	B7QL18
PS10	<i>Ixodes scapularis</i>	UniProtKB	B7PI01
PS10	<i>Ixodes scapularis</i>	UniProtKB	B7PC00
PS10	<i>Nasonia vitripennis</i>	UniProtKB	K7IV06
PS10	<i>Nasonia vitripennis</i>	UniProtKB	K7J463
PS10	<i>Nasonia vitripennis</i>	UniProtKB	K7IV07
PS10	<i>Ornithorhynchus anatinus</i>	UniProtKB	F7D0S5
PS10	<i>Oryctolagus cuniculus</i>	UniProtKB	G1TBX4
PS10	<i>Oryzias latipes</i>	UniProtKB	H2LTH1
PS10	<i>Pan troglodytes</i>	UniProtKB	G2HH61
PS10	<i>Papilio xuthus</i>	UniProtKB	I4DN75
PS10	<i>Pelodiscus sinensis</i>	UniProtKB	K7GBC6
PS10	<i>Pteropus alecto</i>	UniProtKB	L5KLT5
PS10	<i>Sitodiplosis mosellana</i>	UniProtKB	Q49B95
PS10	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15261778
PS10	<i>Speleonectes cf. tulumensis</i>	von Reumont <i>et al</i> 2014	isotig00119
PS10	<i>Speleonectes cf. tulumensis</i>	von Reumont <i>et al</i> 2014	isotig00121
PS10	<i>Speleonectes cf. tulumensis</i>	von Reumont <i>et al</i> 2014	isotig00120
PS10	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15244955
PS10	<i>Takifugu rubripes</i>	UniProtKB	Q1KL01
PS10	<i>Triatoma brasiliensis</i>	UniProtKB	B3SNT5
PS10	<i>Triatoma brasiliensis</i>	UniProtKB	B3SNT4
PS10	<i>Triatoma infestans</i>	UniProtKB	Q101N9
PS10	<i>Tribolium castaneum</i>	UniProtKB	D7EHX7
PS10	<i>Xenopus laevis</i>	UniProtKB	A8WH57
PS10	<i>Xenopus tropicalis</i>	UniProtKB	Q28DC5
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.1
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.27
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.21
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.24
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.26
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.14
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.15
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.2
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.4
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.5
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.6
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.7
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.10
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.16
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.17
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.13
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.12
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.11
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.19
PS10	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDPS10.22
PS10	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS10.25
PS10	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS10.23
PS10	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS10.3
PS10	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS10.8
PS10	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS10.9
PS10	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS10.18
PS10	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTPS10.20
PS10	<i>Eurythoe complanata</i>	This study	ECPS10.1
PS10	<i>Eurythoe complanata</i>	This study	ECPS10.2
PS10	<i>Eurythoe complanata</i>	This study	ECPS10.3
PS10	<i>Eurythoe complanata</i>	This study	ECPS10.4

PS10	<i>Eurythoe complanata</i>	This study	ECPS10.5
PS10	<i>Eurythoe complanata</i>	This study	ECPS10.6
PS10	<i>Hermodice carunculata</i>	This study	HCPS10.1
PS10	<i>Hermodice carunculata</i>	This study	HCPS10.2
PS10	<i>Hermodice carunculata</i>	This study	HCPS10.3
PS10	<i>Hermodice carunculata</i>	This study	HCPS10.4
PS10	<i>Hermodice carunculata</i>	This study	HCPS10.5
PS10	<i>Paramphinome jeffreysii</i>	This study	PJPS10.5
PS10	<i>Paramphinome jeffreysii</i>	This study	PJPS10.3
PS10	<i>Paramphinome jeffreysii</i>	This study	PJPS10.4
PS10	<i>Paramphinome jeffreysii</i>	This study	PJPS10.2
PS10	<i>Paramphinome jeffreysii</i>	This study	PJPS10.1
Serpin	<i>Anolis carolinensis</i>	UniProtKB	G1KG82
Serpin	<i>Apis mellifera</i>	UniProtKB	H9KU06
Serpin	<i>Apis mellifera</i>	UniProtKB	H9KRD2
Serpin	<i>Apis mellifera</i>	UniProtKB	H9KIY5
Serpin	<i>Bombyx mori</i>	UniProtKB	Q9NGS0
Serpin	<i>Bombyx mori</i>	UniProtKB	P22922
Serpin	<i>Bombyx mori</i>	UniProtKB	A8IE37
Serpin	<i>Bos taurus</i>	UniProtKB	Q5BIR5
Serpin	<i>Caligus clemensi</i>	UniProtKB	C1C0L2
Serpin	<i>Crotalus adamanteus</i>	UniProtKB	J3S9I9
Serpin	<i>Crotalus adamanteus</i>	UniProtKB	J3S0V0
Serpin	<i>Daphnia pulex</i>	UniProtKB	E9HI86
Serpin	<i>Drosophila melanogaster</i>	UniProtKB	Q9U1I5
Serpin	<i>Eriocheir sinensis</i>	UniProtKB	J9PCS4
Serpin	<i>Homo sapiens</i>	UniProtKB	Q96P63
Serpin	<i>Homo sapiens</i>	UniProtKB	P29622
Serpin	<i>Ixodes ricinus</i>	UniProtKB	Q06B75
Serpin	<i>Ixodes ricinus</i>	UniProtKB	Q06B72
Serpin	<i>Lonomia obliqua</i>	UniProtKB	Q5MGH0
Serpin	<i>Manduca sexta</i>	UniProtKB	P14754
Serpin	<i>Mus musculus</i>	UniProtKB	Q9CQV3
Serpin	<i>Mus musculus</i>	UniProtKB	O08800
Serpin	<i>Nasonia vitripennis</i>	UniProtKB	K7INP1
Serpin	<i>Panaeus japonicus</i>	UniProtKB	D1MX62
Serpin	<i>Rhipicephalus microplus</i>	UniProtKB	Q7Z021
Serpin	<i>Speleonectes cf. tulumensis</i>	von Reumont <i>et al</i> 2014	isotig00196
Serpin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15249380
Serpin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15178741
Serpin	<i>Speleonectes cf. tulumensis</i>	GenBank	DMPC15193238
Serpin	<i>Tenebrio molitor</i>	UniProtKB	D1MYQ6
Serpin	<i>Tribolium castaneum</i>	UniProtKB	D6WWG9
Serpin	<i>Xenopus laevis</i>	UniProtKB	Q2MDE1
Serpin	<i>Xenopus tropicalis</i>	UniProtKB	Q5I0S8
Serpin	<i>Xenopus tropicalis</i>	UniProtKB	B1H2G7
Serpin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDSE8
Serpin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDSE11
Serpin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDSE8
Serpin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDSE9
Serpin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDSE10
Serpin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDSE1
Serpin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDSE2
Serpin	<i>Glycera dibranchiata</i>	von Reumont <i>et al</i> 2014	GDSE6
Serpin	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTSE7
Serpin	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTSE4
Serpin	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	GTSE3
Serpin	<i>Eurythoe complanata</i>	This study	ECSE1
Serpin	<i>Eurythoe complanata</i>	This study	ECSE2

Serpin	<i>Eurythoe complanata</i>	This study	ECSER3
Serpin	<i>Eurythoe complanata</i>	This study	ECSER4
Serpin	<i>Eurythoe complanata</i>	This study	ECSER5
Serpin	<i>Eurythoe complanata</i>	This study	ECSER6
Serpin	<i>Eurythoe complanata</i>	This study	ECSER7
Serpin	<i>Eurythoe complanata</i>	This study	ECSER8
Serpin	<i>Eurythoe complanata</i>	This study	ECSER9
Serpin	<i>Hermodice carunculata</i>	This study	HCSER1
Serpin	<i>Hermodice carunculata</i>	This study	HCSER2
Serpin	<i>Hermodice carunculata</i>	This study	HCSER3
Serpin	<i>Paramphinome jeffreyssi</i>	This study	PJSER5
Serpin	<i>Paramphinome jeffreyssi</i>	This study	PJSER3
Serpin	<i>Paramphinome jeffreyssi</i>	This study	PJSER4
Serpin	<i>Paramphinome jeffreyssi</i>	This study	PJSER1
Serpin	<i>Paramphinome jeffreyssi</i>	This study	PJSER2
ShK	<i>Actinia equina</i>	UniProtKB	P81897
ShK	<i>Anemonia erythraea</i>	UniProtKB	Q0EAE5
ShK	<i>Anemonia sulcata</i>	UniProtKB	Q9TWG1
ShK	<i>Aurelia aurita</i>	UniProtKB	Q0MWV8
ShK	<i>Bos taurus</i>	UniProtKB	Q2TBM7
ShK	<i>Bunodosoma caissarum</i>	UniProtKB	C0HJC2
ShK	<i>Bunodosoma caissarum</i>	UniProtKB	C0HJC3
ShK	<i>Bunodosoma granuliferum</i>	UniProtKB	P29186
ShK	<i>Caenorhabditis elegans</i>	UniProtKB	Q95Q39
ShK	<i>Caenorhabditis elegans</i>	UniProtKB	Q23490
ShK	<i>Caenorhabditis elegans</i>	UniProtKB	Q7JLI1
ShK	<i>Cryptodendrum adhaesivum</i>	UniProtKB	E2S064
ShK	<i>Heteractis magnifica</i>	UniProtKB	O16846
ShK	<i>Heterodactyla hemprichii</i>	UniProtKB	E2S065
ShK	<i>Homo sapiens</i>	UniProtKB	O75900
ShK	<i>Homo sapiens</i>	UniProtKB	P16562
ShK	<i>Homo sapiens</i>	UniProtKB	P54107
ShK	<i>Macaca mulatta</i>	UniProtKB	Q9XSD3
ShK	<i>Metridium senile</i>	UniProtKB	P11495
ShK	<i>Mus musculus</i>	UniProtKB	P16563
ShK	<i>Mus musculus</i>	UniProtKB	Q03401
ShK	<i>Mus musculus</i>	UniProtKB	O88676
ShK	<i>Naja atra</i>	UniProtKB	Q7ZZN8
ShK	<i>Naja kaouthia</i>	UniProtKB	P84805
ShK	<i>Naja kaouthia</i>	UniProtKB	P84808
ShK	<i>Ophiophagus hannah</i>	UniProtKB	Q7ZT98
ShK	<i>Rattus norvegicus</i>	UniProtKB	O88272
ShK	<i>Rattus norvegicus</i>	UniProtKB	P12020
ShK	<i>Rhabdophis tigrinus tigrinus</i>	UniProtKB	Q8JGT9
ShK	<i>Sistrurus catenatus edwardsii</i>	UniProtKB	B0VXV6
ShK	<i>Stichodactyla gigantea</i>	UniProtKB	E2S061
ShK	<i>Stichodactyla haddoni</i>	UniProtKB	E2S062
ShK	<i>Stichodactyla helianthus</i>	UniProtKB	P29187
ShK	<i>Stichodactyla mertensii</i>	UniProtKB	E2S063
ShK	<i>Thalassianthus aster</i>	UniProtKB	E2S066
ShK	<i>Varanus varius</i>	UniProtKB	Q2XXP1
ShK	<i>Varanus varius</i>	UniProtKB	Q2XXP2
ShK	<i>Vipera nikolskii</i>	UniProtKB	B7FDI0
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	10Dib_IDBA_Interpro_Hmmer_cont
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	7Dib_IDBA_Interpro_Hmmer_conti
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	8Dib_IDBA_Interpro_Hmmer_conti
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	6Dib_IDBA_Interpro_contig_2256
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	5Dib_IDBA_Interpro_contig_1437
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	3Dib_IDBA_Interpro_contig_1533

ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	2Dib_IDBA_Interpro_contig_2190
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	11Dib_IDBA_Interpro_contig_215
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	12Dib_IDBA_Interpro_Hmmer_cont
ShK	<i>Glycera dibrabchiata</i>	von Reumont <i>et al</i> 2014	9Dib_IDBA_Interpro_Hmmer_conti
ShK	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	4Tri_Body_IDBA_Interpro_Hmmer_
ShK	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	1Tri_Body_IDBA_Interpro_conti
ShK	<i>Glycera tridactyla</i>	von Reumont <i>et al</i> 2014	13Tri_IDBA_BLAST_contig_2668_p
ShK	<i>Eurythoe complanata</i>	This study	1 Eco_Loc_3099_Tr_16_21_Conf_0.3
ShK	<i>Eurythoe complanata</i>	This study	2 Eco_Loc_13104_Tr_14_18_Conf_0.
ShK	<i>Eurythoe complanata</i>	This study	3 Eco_Loc_13104_Tr_17_18_Conf_0.
ShK	<i>Eurythoe complanata</i>	This study	4 Eco_Loc_13104_Tr_10_18_Conf_0.
ShK	<i>Hermodice carunculata</i>	This study	1 TR2381lc0_g1_ilm.105457
ShK	<i>Hermodice carunculata</i>	This study	2 TR16493lc3_g1_ilm.749336
ShK	<i>Paramphinome jeffreysii</i>	This study	2paramphinome_s7_sc33_trim_unp
ShK	<i>Paramphinome jeffreysii</i>	This study	4paramphinome_s7_sc33_trim_unp
ShK	<i>Paramphinome jeffreysii</i>	This study	1paramphinome_s7_sc33_trim_unp

Table S3. Clusters of orthologous toxins

Cluster	Sequences	Representative sequence
cluster1	19	TR25756
cluster2	16	TR21764
cluster3	14	Eco_Loc_15508_Tr_4_10_Conf_0.455_Lgt_1919
cluster4	13	Eco_Loc_913_Tr_4_9_Conf_0.333_Lgt_764
cluster5	12	paramphinome_s7_sc33_trim_unpaired_contig_10441
cluster6	12	Eco_Loc_13576_Tr_9_14_Conf_0.545_Lgt_2176
cluster7	12	Eco_Loc_11419_Tr_9_10_Conf_0.464_Lgt_1531
cluster8	12	Eco_Loc_2417_Tr_6_12_Conf_0.630_Lgt_3255
cluster13	9	paramphinome_s7_sc33_trim_unpaired_contig_1396
cluster18	9	Eco_Loc_11521_Tr_8_9_Conf_0.393_Lgt_2253
cluster21	8	Eco_Loc_15464_Tr_5_10_Conf_0.571_Lgt_3460
cluster23	8	Eco_Loc_62686_Tr_2_6_Conf_0.643_Lgt_2630
cluster25	8	Eco_Loc_18_Tr_5_11_Conf_0.559_Lgt_2412
cluster26	7	paramphinome_s7_sc33_trim_unpaired_contig_6003
cluster27	7	TR51106
cluster31	7	Eco_Loc_11913_Tr_9_11_Conf_0.366_Lgt_3183
cluster32	7	Eco_Loc_4574_Tr_23_28_Conf_0.231_Lgt_3575
cluster33	7	Eco_Loc_18238_Tr_3_4_Conf_0.417_Lgt_955
cluster35	7	Eco_Loc_58382_Tr_2_4_Conf_0.700_Lgt_1223
cluster37	6	paramphinome_s7_sc33_trim_unpaired_contig_11330
cluster44	5	TR30873
cluster51	5	Eco_Loc_3099_Tr_16_21_Conf_0.329_Lgt_2249
cluster52	5	Eco_Loc_19595_Tr_1_3_Conf_0.571_Lgt_1002
cluster56	4	Eco_Loc_35431_Tr_2_2_Conf_1.000_Lgt_1424
cluster57	4	Eco_Loc_45670_Tr_1_3_Conf_0.714_Lgt_486
cluster58	4	Eco_Loc_42537_Tr_4_4_Conf_0.455_Lgt_769
cluster59	4	Eco_Loc_46199_Tr_1_2_Conf_1.000_Lgt_1351
cluster64	4	paramphinome_s7_sc33_trim_unpaired_contig_46697
cluster76	3	paramphinome_s7_sc33_trim_unpaired_contig_5942
cluster77	3	paramphinome_s7_sc33_trim_unpaired_contig_9338
cluster78	3	paramphinome_s7_sc33_trim_unpaired_contig_14755
cluster79	3	paramphinome_s7_sc33_trim_unpaired_contig_9727
cluster80	3	paramphinome_s7_sc33_trim_unpaired_contig_3169
cluster81	3	paramphinome_s7_sc33_trim_unpaired_contig_13741

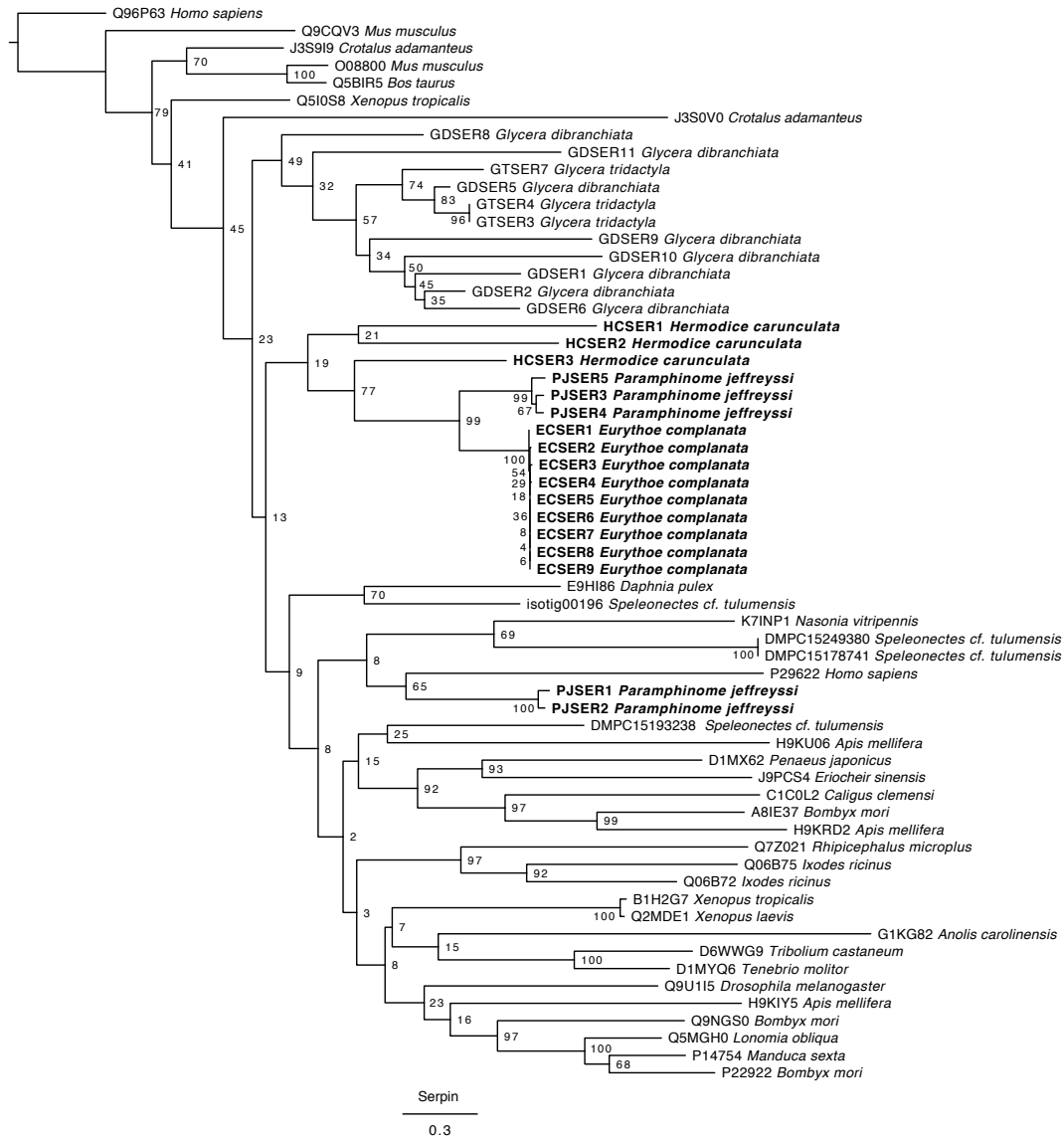


Figure S1. Phylogenetic tree of serpin-like sequences. Serpin phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs (marked in bold). Tree reconstructed with RAXML-HPC-PTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes.

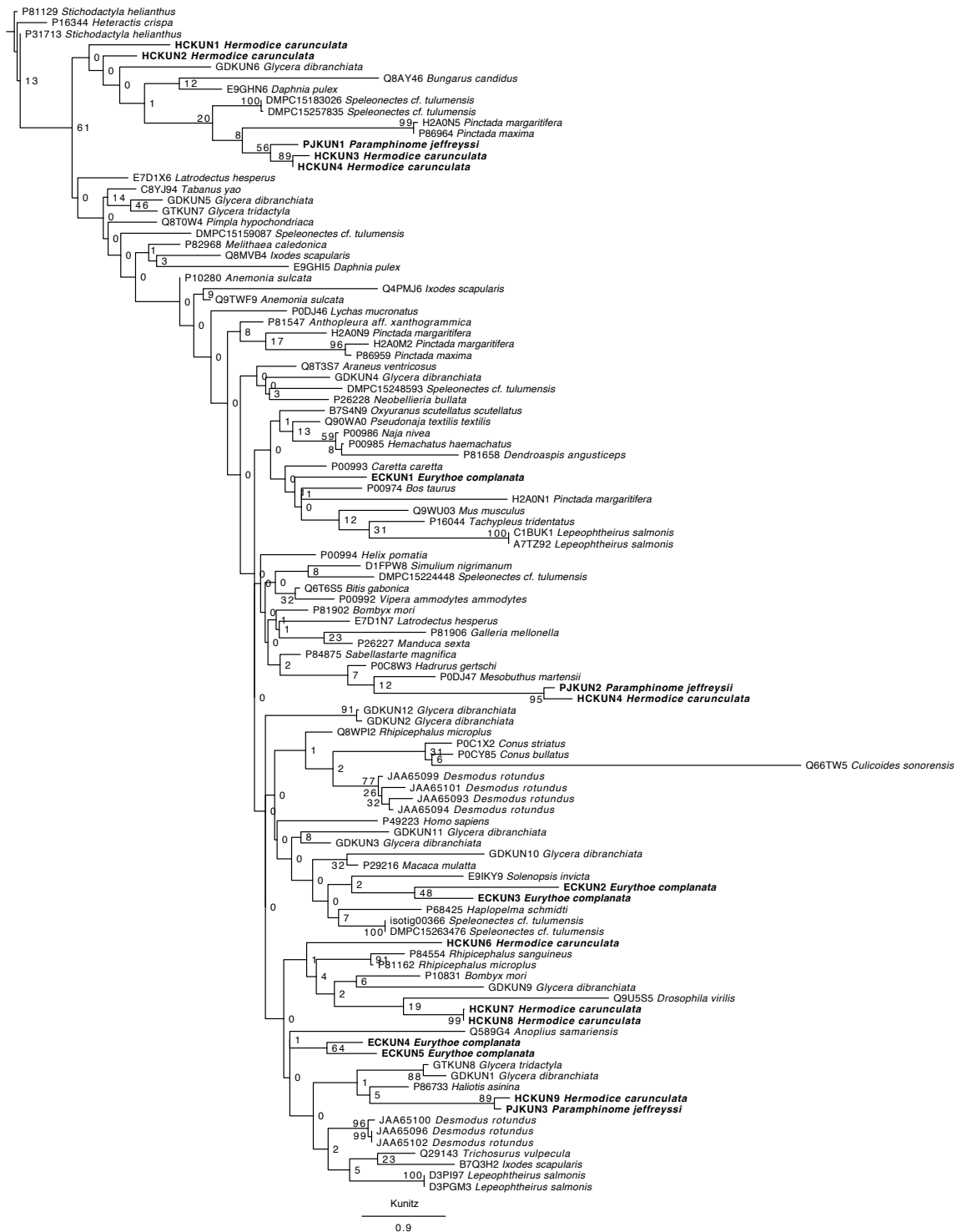


Figure S2. Phylogenetic tree of Kunitz-type protease inhibitors. Kunitz-type protease inhibitors phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs (marked in bold). Tree reconstructed with RAxML-HPC-PTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes.



Figure S3. Phylogenetic tree of peptidase S1 serine proteases. Peptidase S1 phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs (marked in bold). Tree reconstructed with RAxML-HPC-PTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes.



Figure S4. Phylogenetic tree of peptidase S10 serine proteases. Peptidase S10 phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs (marked in bold). Tree reconstructed with RAxML-HPC-PTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes.

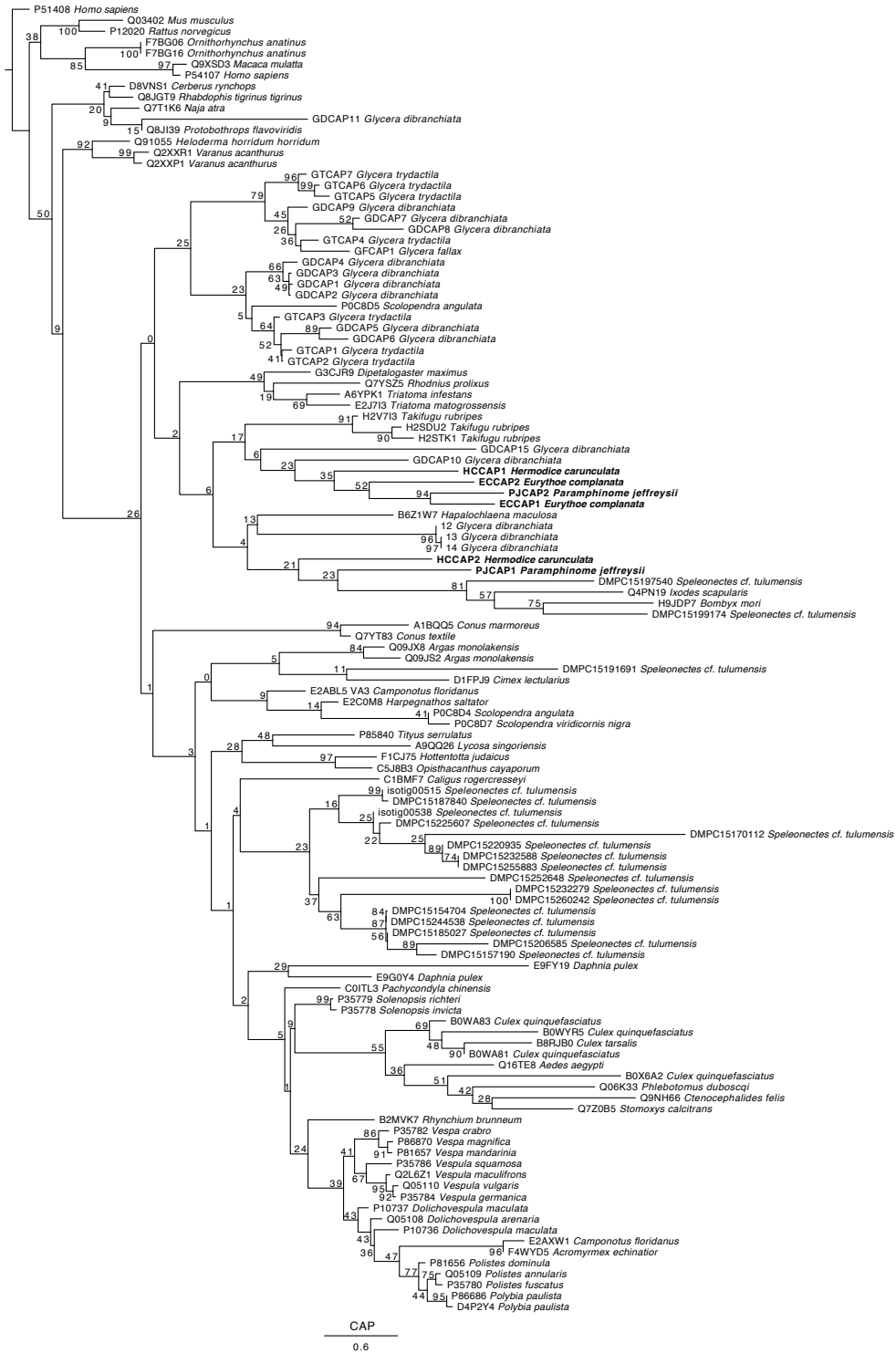


Figure S5. Phylogenetic tree of CAP sequences. CAP phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs (marked in bold). Tree reconstructed with RAXML-HPC-PTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes.

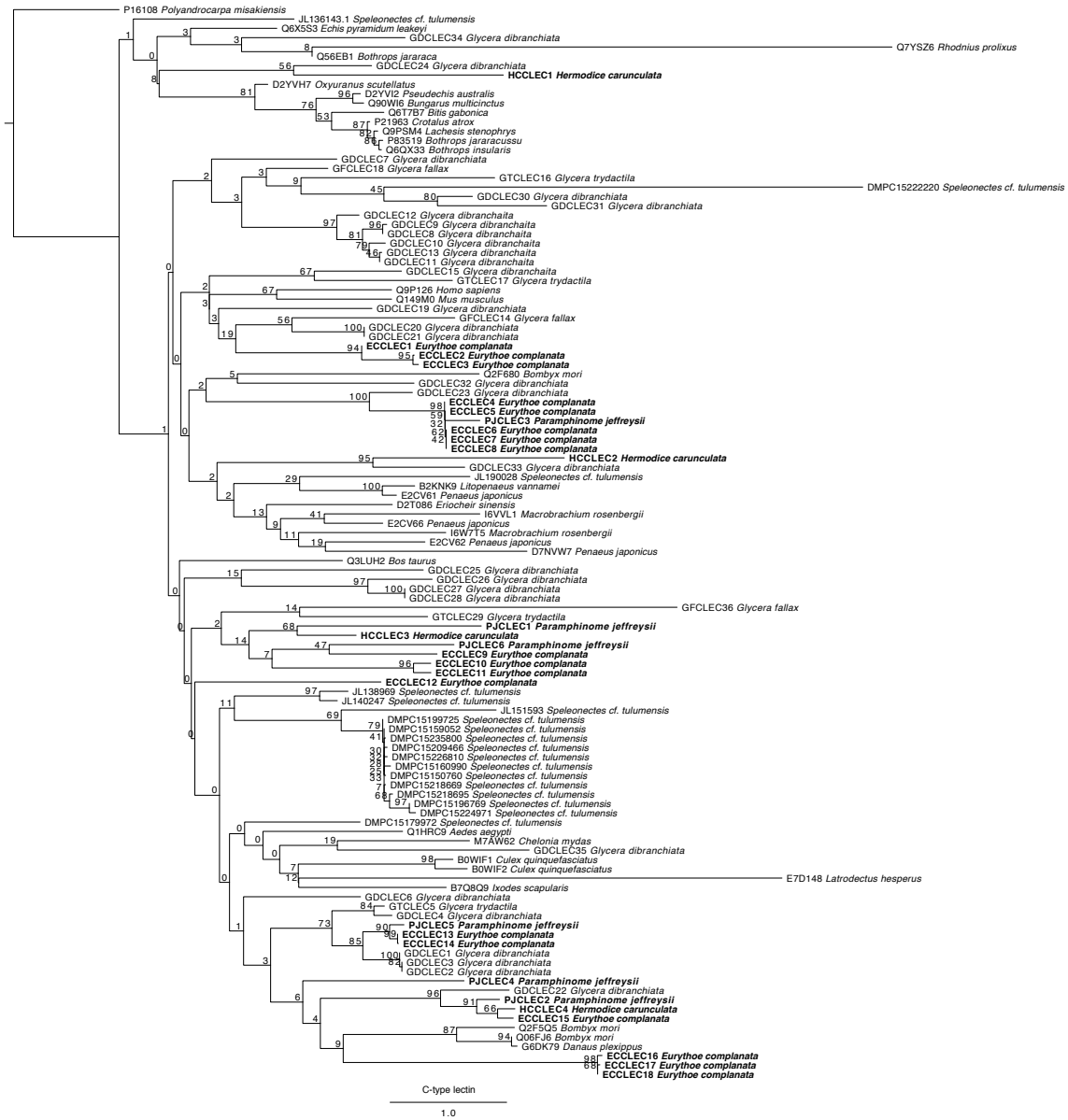


Figure S6. Phylogenetic tree of C-type lectin-like sequences. C-type lectin phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs (marked in bold). Tree reconstructed with RAXML-HPC-PTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes.

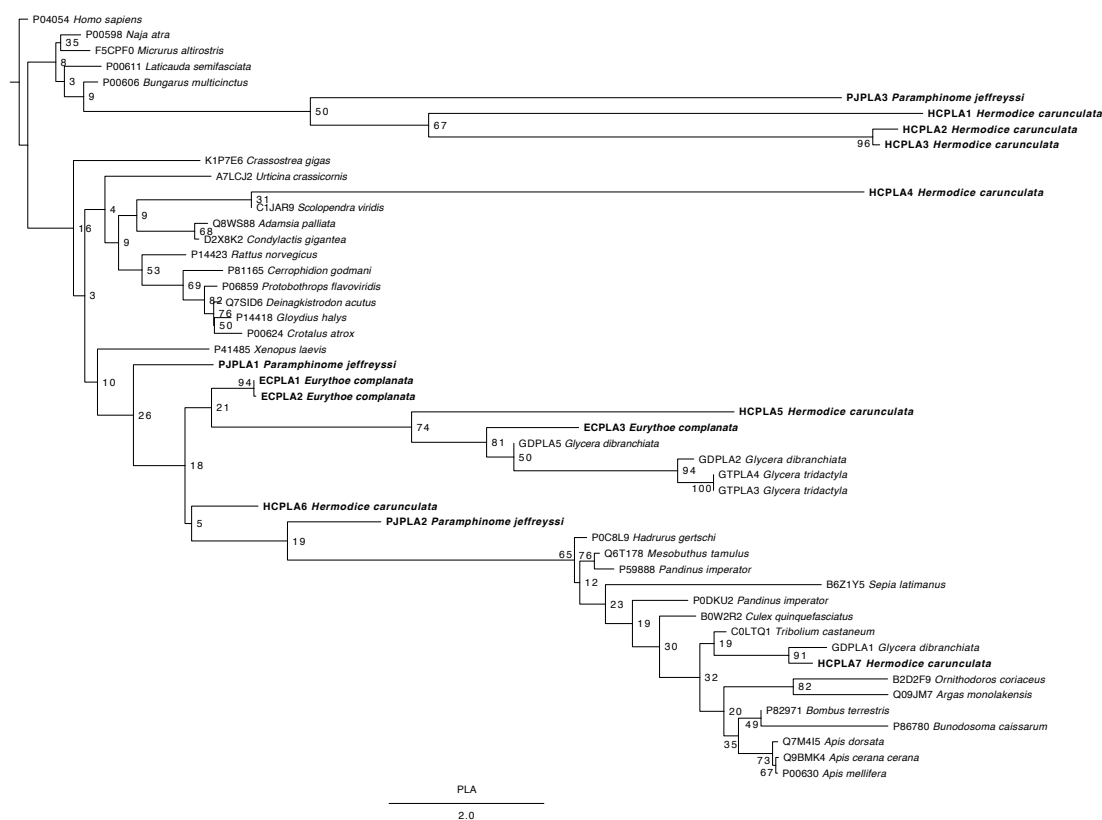


Figure S7. Phylogenetic tree of phospholipase-like sequences. Phospholipase phylogeny including sequences from venomous and non-venomous taxa and fireworm homologs (marked in bold). Tree reconstructed with RAxML-HPC-PTHREADS v8.2.10 and support values estimated through a rapid bootstrap algorithm and 1,000 pseudo-replicates. Bootstrap support values are given for all nodes.

Are fireworms venomous? Evidence for the convergent evolution of toxin homologs in three species of fireworms (Annelida, Amphinomidae).

Aida Verdes, Danny Simpson and Mandë Holford

Supplementary Material includes:

Supplementary file S1: supplementary tables S1–S3, supplementary figures S1–S7.

Supplementary file S2: toxin homologs identified in *Eurythoe complanata*.

Supplementary file S3: toxin homologs identified in *Hermodice carunculata*.

Supplementary file S4: toxin homologs identified in *Paramphinome jeffreysii*.

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
Eco_Loc_10282_Tr_1_6_Conf_0.471_Lgt_774 m.2032214	--NA--	--NA--	CAP	1.30E-45	CAP	7.40E-28
Eco_Loc_10282_Tr_6_6_Conf_0.471_Lgt_729 m.2032256	--NA--	--NA--	CAP	4.40E-43	CAP	6.00E-28
Eco_Loc_105292_Tr_1_4_Conf_0.462_Lgt_365 m.5146690	--NA--	--NA--	C-type lectin	4.00E-13	C-type lectin	2.40E-07
Eco_Loc_105292_Tr_2_4_Conf_0.231_Lgt_732 m.5146701	--NA--	--NA--	C-type lectin	8.80E-11	--NA--	--NA--
Eco_Loc_105292_Tr_4_4_Conf_0.615_Lgt_564 m.5146720	Salivary C-type lectin	1.40E-15	C-type lectin	1.60E-29	C-type lectin	1.30E-22
Eco_Loc_107062_Tr_1_1_Conf_1.000_Lgt_382 m.5166293	Galactose-specific lectin nattectin	3.10E-06	C-type lectin	9.60E-16	C-type lectin	1.40E-11
Eco_Loc_109364_Tr_1_1_Conf_1.000_Lgt_369 m.5187678	Serpin	2.30E-11	Serpin	2.50E-19	Serpin	1.60E-16
Eco_Loc_11216_Tr_15_16_Conf_0.244_Lgt_3245 m.2154298	Kazal	3.30E-10	Kazal	6.40E-19	Kazal	1.60E-13
Eco_Loc_11329_Tr_2_4_Conf_0.500_Lgt_730 m.2170859	ArgT64	9.90E-14	--NA--	--NA--	--NA--	--NA--
Eco_Loc_11419_Tr_10_10_Conf_0.464_Lgt_1531 m.2180494	Galactose-specific lectin nattectin	1.50E-08	C-type lectin	6.70E-23	C-type lectin	9.80E-20
Eco_Loc_11419_Tr_1_10_Conf_0.321_Lgt_1287 m.2180359	Galactose-specific lectin nattectin	2.90E-09	C-type lectin	1.60E-23	C-type lectin	7.10E-20
Eco_Loc_11419_Tr_2_10_Conf_0.464_Lgt_1615 m.2180374	--NA--	--NA--	C-type lectin	1.00E-23	C-type lectin	1.10E-19
Eco_Loc_11419_Tr_3_10_Conf_0.464_Lgt_1518 m.2180392	Galactose-specific lectin nattectin	1.70E-08	C-type lectin	6.90E-23	C-type lectin	1.00E-19
Eco_Loc_11419_Tr_4_10_Conf_0.464_Lgt_1531 m.2180408	Galactose-specific lectin nattectin	1.60E-08	C-type lectin	6.80E-23	C-type lectin	9.80E-20
Eco_Loc_11419_Tr_5_10_Conf_0.464_Lgt_1531 m.2180424	Galactose-specific lectin nattectin	1.50E-08	C-type lectin	6.70E-23	C-type lectin	9.80E-20
Eco_Loc_11419_Tr_7_10_Conf_0.464_Lgt_1615 m.2180445	--NA--	--NA--	C-type lectin	4.00E-23	C-type lectin	3.90E-19
Eco_Loc_11419_Tr_8_10_Conf_0.286_Lgt_1297 m.2180463	Galactose-specific lectin nattectin	8.90E-09	C-type lectin	3.90E-23	C-type lectin	2.50E-19
Eco_Loc_11419_Tr_9_10_Conf_0.464_Lgt_1531 m.2180478	C-type lectin	1.10E-08	C-type lectin	7.40E-23	C-type lectin	1.30E-19
Eco_Loc_11521_Tr_2_9_Conf_0.321_Lgt_1555 m.2191665	Peptidase S1	1.00E-77	Peptidase S1	2.10E-52	Peptidase S1	1.00E-43
Eco_Loc_11521_Tr_4_9_Conf_0.393_Lgt_2253 m.2191716	Peptidase S1	6.10E-83	Peptidase S1	8.90E-53	Peptidase S1	2.30E-44
Eco_Loc_11521_Tr_5_9_Conf_0.143_Lgt_817 m.2191746	Peptidase S1	2.00E-29	Peptidase S1	4.80E-23	Peptidase S1	1.70E-18
Eco_Loc_11521_Tr_6_9_Conf_0.393_Lgt_2253 m.2191757	Peptidase S1	6.10E-83	Peptidase S1	8.90E-53	Peptidase S1	2.30E-44
Eco_Loc_11521_Tr_7_9_Conf_0.464_Lgt_2629 m.2191789	Peptidase S1	2.80E-78	Peptidase S1	2.70E-52	Peptidase S1	1.70E-43
Eco_Loc_11521_Tr_8_9_Conf_0.393_Lgt_2253 m.2191824	Peptidase S1	6.10E-83	Peptidase S1	8.90E-53	Peptidase S1	2.30E-44
Eco_Loc_11521_Tr_9_9_Conf_0.464_Lgt_2629 m.2191855	Peptidase S1	1.00E-77	Peptidase S1	2.10E-52	Peptidase S1	1.00E-43
Eco_Loc_11545_Tr_2_10_Conf_0.480_Lgt_1758 m.2196029	Peptidase S10	4.00E-87	Peptidase S10	1.40E-70	Peptidase S10	4.10E-71
Eco_Loc_115735_Tr_2_3_Conf_0.778_Lgt_1079 m.5246401	--NA--	--NA--	Metalloproteinase M12	4.90E-20	Metalloproteinase M12	3.30E-18
Eco_Loc_116349_Tr_1_1_Conf_1.000_Lgt_501 m.5252812	Turriptide Ici9.1	7.20E-10	Kazal	2.50E-15	Kazal	7.10E-14
Eco_Loc_116444_Tr_1_1_Conf_1.000_Lgt_464 m.5254235	--NA--	--NA--	C-type lectin	8.20E-16	C-type lectin	3.40E-10
Eco_Loc_11717_Tr_3_3_Conf_0.667_Lgt_704 m.2219085	--NA--	--NA--	CAP	2.60E-34	CAP	4.00E-25
Eco_Loc_117617_Tr_2_2_Conf_1.000_Lgt_641 m.5272062	Three-finger toxin MALT0070C	6.10E-06	--NA--	--NA--	--NA--	--NA--
Eco_Loc_11913_Tr_11_11_Conf_0.366_Lgt_3182 m.2242905	Metalloproteinase	4.60E-43	--NA--	--NA--	Metalloproteinase M12	1.80E-22
Eco_Loc_11913_Tr_3_11_Conf_0.366_Lgt_3182 m.2242708	Metalloproteinase	4.00E-43	Metalloproteinase M12	5.90E-23	Metalloproteinase M12	1.80E-22
Eco_Loc_11913_Tr_5_11_Conf_0.366_Lgt_3182 m.2242759	Metalloproteinase	4.80E-43	--NA--	--NA--	Metalloproteinase M12	1.80E-22
Eco_Loc_11913_Tr_7_11_Conf_0.415_Lgt_3248 m.2242809	Metalloproteinase	3.40E-43	--NA--	--NA--	Metalloproteinase M12	1.90E-22
Eco_Loc_11913_Tr_9_11_Conf_0.366_Lgt_3183 m.2242856	Metalloproteinase	3.50E-43	--NA--	--NA--	Metalloproteinase M12	1.80E-22
Eco_Loc_121646_Tr_1_2_Conf_1.000_Lgt_532 m.5322440	CAP	1.90E-12	CAP	1.40E-20	CAP	6.20E-13
Eco_Loc_121646_Tr_2_2_Conf_1.000_Lgt_538 m.5322446	CAP	1.10E-13	CAP	1.00E-21	CAP	6.90E-14
Eco_Loc_127214_Tr_1_1_Conf_1.000_Lgt_403 m.5380037	Venom protein 164	3.60E-06	--NA--	--NA--	--NA--	--NA--
Eco_Loc_128019_Tr_1_1_Conf_1.000_Lgt_521 m.5387696	Metalloproteinase	1.90E-12	--NA--	--NA--	--NA--	--NA--
Eco_Loc_128244_Tr_1_1_Conf_1.000_Lgt_490 m.5390017	--NA--	--NA--	C-type lectin	1.20E-21	C-type lectin	4.00E-19
Eco_Loc_12842_Tr_10_14_Conf_0.190_Lgt_2096 m.2338761	--NA--	--NA--	C-type lectin	1.10E-28	C-type lectin	1.90E-24
Eco_Loc_12842_Tr_12_14_Conf_0.214_Lgt_2096 m.2338798	--NA--	--NA--	C-type lectin	1.00E-28	C-type lectin	1.20E-24
Eco_Loc_12842_Tr_13_14_Conf_0.143_Lgt_656 m.2338828	--NA--	--NA--	C-type lectin	6.50E-17	C-type lectin	2.30E-11
Eco_Loc_12842_Tr_14_14_Conf_0.214_Lgt_2096 m.2338836	--NA--	--NA--	C-type lectin	1.10E-28	C-type lectin	1.90E-24
Eco_Loc_12842_Tr_8_14_Conf_0.119_Lgt_641 m.2338746	--NA--	--NA--	C-type lectin	6.20E-15	C-type lectin	5.60E-10
Eco_Loc_130016_Tr_1_1_Conf_1.000_Lgt_300 m.5406450	--NA--	--NA--	Hainantoxin	5.90E-07	--NA--	--NA--
Eco_Loc_13104_Tr_10_18_Conf_0.151_Lgt_1361 m.2366006	ShK-like	2.30E-36	--NA--	--NA--	ShK	5.10E-06
Eco_Loc_13104_Tr_12_18_Conf_0.208_Lgt_1361 m.2366048	ShK-like	9.30E-37	--NA--	--NA--	ShK	4.20E-06
Eco_Loc_13104_Tr_14_18_Conf_0.208_Lgt_1891 m.2366076	ShK-like	9.70E-37	--NA--	--NA--	ShK	4.20E-06
Eco_Loc_13104_Tr_15_18_Conf_0.113_Lgt_1125 m.2366107	ShK-like	7.20E-30	--NA--	--NA--	ShK	4.80E-06
Eco_Loc_13104_Tr_17_18_Conf_0.208_Lgt_1891 m.2366139	ShK-like	9.50E-37	--NA--	--NA--	ShK	4.20E-06
Eco_Loc_132060_Tr_1_2_Conf_1.000_Lgt_1541 m.5423559	--NA--	--NA--	Metalloproteinase M12	1.60E-16	Metalloproteinase M12	1.70E-15
Eco_Loc_132060_Tr_2_2_Conf_1.000_Lgt_800 m.5423580	Metalloproteinase	4.90E-10	--NA--	--NA--	--NA--	--NA--
Eco_Loc_13440_Tr_1_3_Conf_0.500_Lgt_771 m.2401937	Galactose-specific lectin nattectin	7.30E-13	C-type lectin	4.00E-29	C-type lectin	1.50E-19
Eco_Loc_13440_Tr_3_3_Conf_0.500_Lgt_791 m.2401955	--NA--	--NA--	C-type lectin	7.70E-28	C-type lectin	1.40E-18
Eco_Loc_13576_Tr_10_14_Conf_0.500_Lgt_2192 m.2416258	Serpin	4.80E-100	Serpin	3.60E-132	Serpin	3.30E-126
Eco_Loc_13576_Tr_11_14_Conf_0.432_Lgt_2532 m.2416286	Serpin	3.30E-100	Serpin	6.00E-133	Serpin	4.90E-127
Eco_Loc_13576_Tr_12_14_Conf_0.227_Lgt_1388 m.2416324	--NA--	--NA--	Serpin	7.90E-103	Serpin	2.60E-98
Eco_Loc_13576_Tr_13_14_Conf_0.477_Lgt_2192 m.2416340	Serpin	4.80E-100	Serpin	3.60E-132	Serpin	3.30E-126
Eco_Loc_13576_Tr_14_14_Conf_0.432_Lgt_2532 m.2416372	Serpin	4.80E-100	Serpin	3.60E-132	Serpin	3.30E-126
Eco_Loc_13576_Tr_5_14_Conf_0.523_Lgt_2176 m.2416108	Serpin	4.80E-100	Serpin	3.60E-132	Serpin	3.30E-126
Eco_Loc_13576_Tr_6_14_Conf_0.432_Lgt_2532 m.2416136	Serpin	1.20E-100	Serpin	3.30E-132	Serpin	3.10E-126
Eco_Loc_13576_Tr_7_14_Conf_0.364_Lgt_1797 m.2416173	Serpin	4.00E-100	Serpin	3.60E-132	Serpin	3.30E-126
Eco_Loc_13576_Tr_8_14_Conf_0.432_Lgt_2532 m.2416193	Serpin	9.10E-101	Serpin	2.00E-132	Serpin	2.30E-126
Eco_Loc_13576_Tr_9_14_Conf_0.545_Lgt_2176 m.2416230	Serpin	4.80E-100	Serpin	3.60E-132	Serpin	3.30E-126
Eco_Loc_14013_Tr_1_3_Conf_0.833_Lgt_2056 m.2461660	Cysteine-rich venom protein	3.70E-19	CAP	3.50E-27	CAP	1.10E-20
Eco_Loc_14013_Tr_2_3_Conf_0.833_Lgt_2056 m.2461693	Cysteine-rich venom protein	4.20E-19	CAP	3.50E-27	CAP	1.30E-20
Eco_Loc_14013_Tr_3_3_Conf_0.833_Lgt_2056 m.2461726	Cysteine-rich venom protein	4.20E-19	CAP	3.50E-27	CAP	1.30E-20
Eco_Loc_14064_Tr_10_10_Conf_0.640_Lgt_2849 m.2466988	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
Eco_Loc_14064_Tr_1_10_Conf_0.640_Lgt_2806 m.246668	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_14064_Tr_2_10_Conf_0.640_Lgt_2858 m.2466704	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_14064_Tr_3_10_Conf_0.600_Lgt_2928 m.2466743	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_14064_Tr_4_10_Conf_0.640_Lgt_2849 m.2466783	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_14064_Tr_5_10_Conf_0.640_Lgt_2848 m.2466820	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_14064_Tr_6_10_Conf_0.320_Lgt_1559 m.2466857	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_14064_Tr_7_10_Conf_0.640_Lgt_2849 m.2466877	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_14064_Tr_8_10_Conf_0.640_Lgt_2851 m.2466914	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_14064_Tr_9_10_Conf_0.600_Lgt_2829 m.2466951	Conopressin/neurophysin	7.30E-36	--NA--	--NA--	--NA--	--NA--
Eco_Loc_143478_Tr_2_3_Conf_0.500_Lgt_579 m.5529928	--NA--	--NA--	Cystatin	2.20E-12	Cystatin	6.50E-12
Eco_Loc_143478_Tr_3_3_Conf_0.500_Lgt_641 m.5529936	--NA--	--NA--	Cystatin	2.00E-12	Cystatin	6.50E-12
Eco_Loc_145365_Tr_1_1_Conf_1.000_Lgt_637 m.5547198	Venom factor 1	4.50E-16	--NA--	--NA--	--NA--	--NA--
Eco_Loc_145390_Tr_1_2_Conf_1.000_Lgt_390 m.5547383	--NA--	--NA--	Serpin	5.10E-11	Serpin	1.60E-08
Eco_Loc_145390_Tr_2_2_Conf_1.000_Lgt_414 m.5547388	--NA--	--NA--	Serpin	5.30E-13	Serpin	3.50E-11
Eco_Loc_14901_Tr_11_17_Conf_0.354_Lgt_3629 m.2546241	--NA--	--NA--	Metalloproteinase M12	2.00E-12	Metalloproteinase M12	2.70E-13
Eco_Loc_14901_Tr_12_17_Conf_0.200_Lgt_1862 m.2546280	--NA--	--NA--	Metalloproteinase M12	2.50E-12	Metalloproteinase M12	2.70E-13
Eco_Loc_14901_Tr_13_17_Conf_0.169_Lgt_2741 m.2546303	Zinc metalloproteinase dpy-31	3.10E-64	Metalloproteinase M12	1.30E-11	Metalloproteinase M12	2.70E-11
Eco_Loc_14901_Tr_14_17_Conf_0.092_Lgt_964 m.2546336	Metalloproteinase	2.20E-40	Metalloproteinase M12	2.40E-11	Metalloproteinase M12	3.80E-12
Eco_Loc_14901_Tr_15_17_Conf_0.185_Lgt_1906 m.2546352	--NA--	--NA--	Metalloproteinase M12	2.10E-12	Metalloproteinase M12	2.90E-13
Eco_Loc_14901_Tr_16_17_Conf_0.185_Lgt_3184 m.2546378	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	4.40E-11
Eco_Loc_14901_Tr_8_17_Conf_0.185_Lgt_1906 m.2546173	Zinc metalloproteinase dpy-31	8.00E-73	Metalloproteinase M12	2.80E-12	Metalloproteinase M12	2.80E-13
Eco_Loc_14901_Tr_9_17_Conf_0.185_Lgt_1912 m.2546199	Zinc metalloproteinase dpy-31	2.20E-72	Metalloproteinase M12	1.50E-12	Metalloproteinase M12	2.90E-13
Eco_Loc_1493_Tr_1_4_Conf_0.700_Lgt_783 m.388178	--NA--	--NA--	C-type lectin	4.80E-27	C-type lectin	2.90E-18
Eco_Loc_1493_Tr_2_4_Conf_0.200_Lgt_724 m.388196	--NA--	--NA--	C-type lectin	6.00E-26	C-type lectin	1.00E-18
Eco_Loc_1493_Tr_3_4_Conf_0.700_Lgt_787 m.388212	--NA--	--NA--	C-type lectin	1.40E-26	C-type lectin	6.60E-18
Eco_Loc_1493_Tr_4_4_Conf_0.700_Lgt_783 m.388231	--NA--	--NA--	C-type lectin	3.90E-27	C-type lectin	1.10E-18
Eco_Loc_15464_Tr_10_10_Conf_0.571_Lgt_3460 m.2600263	--NA--	--NA--	Metalloproteinase M12	2.90E-14	--NA--	--NA--
Eco_Loc_15464_Tr_1_10_Conf_0.607_Lgt_3460 m.2599935	--NA--	--NA--	Metalloproteinase M12	3.20E-14	--NA--	--NA--
Eco_Loc_15464_Tr_5_10_Conf_0.571_Lgt_3460 m.2600041	--NA--	--NA--	Metalloproteinase M12	2.90E-14	--NA--	--NA--
Eco_Loc_15464_Tr_6_10_Conf_0.571_Lgt_3460 m.2600090	--NA--	--NA--	Metalloproteinase M12	6.20E-14	--NA--	--NA--
Eco_Loc_15464_Tr_7_10_Conf_0.571_Lgt_3460 m.2600139	--NA--	--NA--	Metalloproteinase M12	2.90E-14	--NA--	--NA--
Eco_Loc_15464_Tr_9_10_Conf_0.571_Lgt_3460 m.2600213	--NA--	--NA--	Metalloproteinase M12	5.80E-14	--NA--	--NA--
Eco_Loc_154738_Tr_1_1_Conf_1.000_Lgt_655 m.5619863	Metalloproteinase	2.70E-17	--NA--	--NA--	--NA--	--NA--
Eco_Loc_15508_Tr_10_10_Conf_0.485_Lgt_1919 m.2603577	Peptidase S1	2.10E-74	Peptidase S1	1.80E-82	Peptidase S1	9.20E-72
Eco_Loc_15508_Tr_1_10_Conf_0.485_Lgt_1544 m.2603351	--NA--	--NA--	Kunitz	3.50E-20	Kunitz	8.20E-22
Eco_Loc_15508_Tr_2_10_Conf_0.545_Lgt_1919 m.2603376	Peptidase S1	1.50E-74	Peptidase S1	1.90E-82	Peptidase S1	9.20E-72
Eco_Loc_15508_Tr_3_10_Conf_0.485_Lgt_1919 m.2603406	Peptidase S1	2.10E-74	Peptidase S1	1.80E-82	Peptidase S1	9.20E-72
Eco_Loc_15508_Tr_4_10_Conf_0.455_Lgt_1919 m.2603436	Peptidase S1	2.10E-74	Peptidase S1	1.80E-82	Peptidase S1	9.20E-72
Eco_Loc_15508_Tr_5_10_Conf_0.455_Lgt_1544 m.2603466	--NA--	--NA--	Kunitz	3.50E-20	Kunitz	8.20E-22
Eco_Loc_15508_Tr_6_10_Conf_0.242_Lgt_937 m.2603491	--NA--	--NA--	Kunitz	1.70E-22	Kunitz	2.40E-22
Eco_Loc_15508_Tr_7_10_Conf_0.515_Lgt_1919 m.2603508	Peptidase S1	2.30E-74	Peptidase S1	1.70E-82	Peptidase S1	1.10E-71
Eco_Loc_15508_Tr_8_10_Conf_0.212_Lgt_937 m.2603538	--NA--	--NA--	Kunitz	2.30E-23	Kunitz	2.40E-22
Eco_Loc_15508_Tr_9_10_Conf_0.394_Lgt_1433 m.2603554	--NA--	--NA--	Kunitz	4.40E-20	Kunitz	7.30E-22
Eco_Loc_15951_Tr_6_11_Conf_0.389_Lgt_3505 m.2639261	Vascular endothelial growth factor A	1.20E-16	--NA--	--NA--	--NA--	--NA--
Eco_Loc_1604_Tr_2_3_Conf_0.667_Lgt_1124 m.417166	Natterin-4	7.50E-10	--NA--	--NA--	--NA--	--NA--
Eco_Loc_1604_Tr_3_3_Conf_0.667_Lgt_1173 m.417182	Natterin-4	9.20E-10	--NA--	--NA--	--NA--	--NA--
Eco_Loc_16090_Tr_69_78_Conf_0.312_Lgt_8670 m.2653793	--NA--	--NA--	--NA--	--NA--	ShK	1.80E-08
Eco_Loc_16090_Tr_70_78_Conf_0.304_Lgt_8678 m.2653927	--NA--	--NA--	--NA--	--NA--	ShK	1.80E-08
Eco_Loc_16090_Tr_71_78_Conf_0.312_Lgt_8661 m.2654057	--NA--	--NA--	--NA--	--NA--	ShK	1.80E-08
Eco_Loc_16090_Tr_73_78_Conf_0.292_Lgt_8655 m.2654212	--NA--	--NA--	--NA--	--NA--	ShK	1.80E-08
Eco_Loc_16090_Tr_78_78_Conf_0.312_Lgt_8666 m.2654472	--NA--	--NA--	--NA--	--NA--	ShK	1.80E-08
Eco_Loc_161299_Tr_2_3_Conf_0.273_Lgt_265 m.5676395	Ryncolin-3	3.90E-07	--NA--	--NA--	--NA--	--NA--
Eco_Loc_16659_Tr_1_1_Conf_1.000_Lgt_1044 m.2704115	--NA--	--NA--	CAP	4.20E-46	CAP	1.40E-32
Eco_Loc_16827_Tr_1_1_Conf_1.000_Lgt_1132 m.2717709	Metalloproteinase	1.10E-30	Metalloproteinase M12	7.70E-11	Metalloproteinase M12	1.40E-12
Eco_Loc_171068_Tr_1_1_Conf_1.000_Lgt_688 m.5747393	Galactose-specific lectin nattertin	2.20E-13	C-type lectin	5.20E-25	C-type lectin	1.90E-18
Eco_Loc_17237_Tr_4_5_Conf_0.583_Lgt_1152 m.2752565	--NA--	--NA--	CAP	3.30E-49	CAP	1.00E-34
Eco_Loc_17237_Tr_5_5_Conf_0.583_Lgt_1155 m.2752584	--NA--	--NA--	CAP	1.20E-48	CAP	8.80E-35
Eco_Loc_172520_Tr_1_1_Conf_1.000_Lgt_182 m.5760131	Actinoporin	4.10E-08	Actinoporin	1.00E-08	Actinoporin	3.70E-08
Eco_Loc_173788_Tr_1_1_Conf_1.000_Lgt_392 m.5770339	Cobra venom factor	3.90E-07	--NA--	--NA--	--NA--	--NA--
Eco_Loc_17799_Tr_25_28_Conf_0.518_Lgt_4919 m.2798982	Kazal	7.20E-48	Kazal	8.10E-13	Kazal	4.10E-10
Eco_Loc_179848_Tr_1_1_Conf_1.000_Lgt_631 m.5814648	--NA--	--NA--	C-type lectin	4.00E-24	C-type lectin	3.60E-17
Eco_Loc_18238_Tr_3_4_Conf_0.417_Lgt_955 m.2834014	--NA--	--NA--	CAP	5.00E-32	CAP	2.80E-23
Eco_Loc_1825_Tr_10_10_Conf_0.528_Lgt_3984 m.482890	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_1_10_Conf_0.611_Lgt_3984 m.482391	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_2_10_Conf_0.528_Lgt_3358 m.482450	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_3_10_Conf_0.528_Lgt_3984 m.482498	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_4_10_Conf_0.528_Lgt_3961 m.482557	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_5_10_Conf_0.528_Lgt_4122 m.482617	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_6_10_Conf_0.528_Lgt_3983 m.482677	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_7_10_Conf_0.472_Lgt_3082 m.482737	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_8_10_Conf_0.500_Lgt_3355 m.482781	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_1825_Tr_9_10_Conf_0.500_Lgt_3984 m.482829	Peptidase S1	1.10E-143	Peptidase S1	6.00E-76	Peptidase S1	5.40E-64
Eco_Loc_18_Tr_11_11_Conf_0.559_Lgt_2412 m.4536	--NA--	--NA--	C-type lectin	3.30E-23	C-type lectin	7.20E-19
Eco_Loc_18_Tr_3_11_Conf_0.471_Lgt_2032 m.4330	--NA--	--NA--	C-type lectin	3.30E-23	C-type lectin	7.30E-19
Eco_Loc_18_Tr_5_11_Conf_0.559_Lgt_2412 m.4374	--NA--	--NA--	C-type lectin	3.30E-23	C-type lectin	7.20E-19
Eco_Loc_18_Tr_6_11_Conf_0.559_Lgt_2380 m.4410	--NA--	--NA--	C-type lectin	3.30E-23	C-type lectin	7.20E-19
Eco_Loc_18_Tr_8_11_Conf_0.500_Lgt_2412 m.4450	--NA--	--NA--	C-type lectin	2.00E-23	C-type lectin	1.00E-18
Eco_Loc_18_Tr_9_11_Conf_0.559_Lgt_2412 m.4487	--NA--	--NA--	C-type lectin	2.90E-23	C-type lectin	7.20E-19
Eco_Loc_19420_Tr_1_3_Conf_0.667_Lgt_1107 m.2926826	--NA--	--NA--	Lipocalin	9.50E-20	Lipocalin	3.70E-14
Eco_Loc_19420_Tr_3_3_Conf_0.667_Lgt_1080 m.2926843	--NA--	--NA--	Lipocalin	9.50E-20	Lipocalin	3.70E-14
Eco_Loc_19595_Tr_1_3_Conf_0.571_Lgt_1002 m.2943085	--NA--	--NA--	Kunitz	3.90E-26	Kunitz	8.80E-24
Eco_Loc_19595_Tr_2_3_Conf_0.571_Lgt_1002 m.2943107	--NA--	--NA--	Kunitz	4.00E-26	Kunitz	8.80E-24
Eco_Loc_19595_Tr_3_3_Conf_0.571_Lgt_1002 m.2943126	--NA--	--NA--	Kunitz	4.00E-26	Kunitz	8.80E-24
Eco_Loc_195982_Tr_1_1_Conf_1.000_Lgt_562 m.5925603	Peptidase S1	6.60E-18	Peptidase S1	2.10E-12	Peptidase S1	1.60E-08
Eco_Loc_198032_Tr_1_1_Conf_1.000_Lgt_695 m.5940951	--NA--	--NA--	C-type lectin	9.90E-07	--NA--	--NA--
Eco_Loc_1981_Tr_10_18_Conf_0.067_Lgt_918 m.519964	Fused toxin protein	4.90E-14	Kunitz	1.60E-09	Kunitz	1.30E-15
Eco_Loc_1981_Tr_11_18_Conf_0.240_Lgt_2500 m.519979	Single Kunitz protease inhibitor 2	2.60E-13	Kunitz	2.50E-16	Kunitz	1.50E-18
Eco_Loc_1981_Tr_12_18_Conf_0.400_Lgt_3470 m.520016	Kunitz-type serine protease inhibitor bitisilin-1	3.10E-17	Kunitz	1.30E-21	Kunitz	1.80E-22
Eco_Loc_1981_Tr_13_18_Conf_0.400_Lgt_3470 m.520069	Kunitz-type serine protease inhibitor bitisilin-1	3.10E-17	Kunitz	1.70E-22	Kunitz	1.80E-22
Eco_Loc_1981_Tr_15_18_Conf_0.107_Lgt_1087 m.520143	Kunitz-type serine protease inhibitor LmKTT	7.90E-09	--NA--	--NA--	Kunitz	3.40E-14
Eco_Loc_1981_Tr_16_18_Conf_0.253_Lgt_2441 m.520163	Single Kunitz protease inhibitor 2	2.60E-13	Kunitz	2.50E-16	Kunitz	1.50E-18
Eco_Loc_1981_Tr_17_18_Conf_0.240_Lgt_2153 m.520198	Kunitz-type serine protease inhibitor bitisilin-1	2.80E-17	Kunitz	1.30E-22	Kunitz	2.50E-23
Eco_Loc_1981_Tr_18_18_Conf_0.400_Lgt_3470 m.520235	Kunitz-type serine protease inhibitor bitisilin-1	3.10E-17	Kunitz	1.70E-22	Kunitz	1.80E-22

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
Eco_Loc_201289_Tr_1_1_Conf_1.000_Lgt_174 m.5962714	--NA--	--NA--	C-type lectin	1.00E-06	--NA--	--NA--
Eco_Loc_204157_Tr_1_1_Conf_1.000_Lgt_323 m.5980454	--NA--	--NA--	C-type lectin	3.80E-14	C-type lectin	1.40E-07
Eco_Loc_205128_Tr_1_1_Conf_1.000_Lgt_350 m.5986008	--NA--	--NA--	C-type lectin	4.00E-09	C-type lectin	2.00E-06
Eco_Loc_207756_Tr_1_1_Conf_1.000_Lgt_483 m.6004964	--NA--	--NA--	C-type lectin	3.90E-06	C-type lectin	7.70E-06
Eco_Loc_20844_Tr_1_3_Conf_0.667_Lgt_1039 m.3034497	Metalloproteinase	2.00E-23	--NA--	--NA--	--NA--	--NA--
Eco_Loc_20844_Tr_2_3_Conf_0.667_Lgt_1061 m.3034513	Metalloproteinase	3.60E-30	Metalloproteinase M12	3.70E-08	Metalloproteinase M12	1.60E-07
Eco_Loc_20844_Tr_3_3_Conf_0.667_Lgt_1061 m.3034530	Metalloproteinase	5.60E-30	Metalloproteinase M12	2.40E-08	Metalloproteinase M12	1.20E-07
Eco_Loc_2190_Tr_10_15_Conf_0.568_Lgt_3252 m.570260	Fused toxin protein	1.70E-13	Kunitz	1.70E-19	Kunitz	3.90E-20
Eco_Loc_2190_Tr_11_15_Conf_0.568_Lgt_3252 m.570311	Fused toxin protein	1.70E-13	Kunitz	1.20E-19	Kunitz	3.90E-20
Eco_Loc_2190_Tr_12_15_Conf_0.523_Lgt_3164 m.570363	Fused toxin protein	1.70E-13	Kunitz	6.50E-20	Kunitz	3.90E-20
Eco_Loc_2190_Tr_14_15_Conf_0.568_Lgt_3252 m.570428	Fused toxin protein	1.80E-13	Kunitz	4.50E-20	Kunitz	3.90E-20
Eco_Loc_2190_Tr_15_15_Conf_0.568_Lgt_3252 m.570481	Fused toxin protein	1.90E-13	Kunitz	4.50E-20	Kunitz	3.90E-20
Eco_Loc_2190_Tr_7_15_Conf_0.545_Lgt_3252 m.570119	Fused toxin protein	2.00E-13	Kunitz	3.40E-19	Kunitz	3.90E-20
Eco_Loc_2190_Tr_9_15_Conf_0.591_Lgt_3252 m.570206	Fused toxin protein	2.00E-13	Kunitz	4.50E-20	Kunitz	3.90E-20
Eco_Loc_23163_Tr_1_2_Conf_1.000_Lgt_1618 m.3171269	Metalloproteinase	1.90E-117	Metalloproteinase M12	5.10E-25	Metalloproteinase M12	9.70E-23
Eco_Loc_23163_Tr_2_2_Conf_1.000_Lgt_1618 m.3171291	Metalloproteinase	1.50E-117	Metalloproteinase M12	3.90E-25	Metalloproteinase M12	1.00E-22
Eco_Loc_2370_Tr_1_5_Conf_0.692_Lgt_2636 m.609772	--NA--	--NA--	Kazal	2.70E-08	Kazal	1.40E-06
Eco_Loc_2370_Tr_2_5_Conf_0.692_Lgt_2636 m.609804	--NA--	--NA--	Kazal	2.70E-08	Kazal	1.40E-06
Eco_Loc_2370_Tr_3_5_Conf_0.692_Lgt_2636 m.609835	--NA--	--NA--	Kazal	2.70E-08	Kazal	1.40E-06
Eco_Loc_2370_Tr_4_5_Conf_0.692_Lgt_2636 m.609867	--NA--	--NA--	Kazal	2.70E-08	Kazal	1.40E-06
Eco_Loc_2370_Tr_5_5_Conf_0.692_Lgt_2636 m.609899	--NA--	--NA--	Kazal	2.70E-08	Kazal	1.40E-06
Eco_Loc_23980_Tr_2_2_Conf_1.000_Lgt_681 m.3221818	--NA--	--NA--	C-type lectin	8.00E-12	C-type lectin	1.30E-11
Eco_Loc_2417_Tr_10_12_Conf_0.587_Lgt_3267 m.618196	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_2417_Tr_11_12_Conf_0.587_Lgt_3246 m.618248	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_2417_Tr_12_12_Conf_0.630_Lgt_3253 m.618301	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_2417_Tr_3_12_Conf_0.630_Lgt_3253 m.617831	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_2417_Tr_4_12_Conf_0.478_Lgt_3050 m.617884	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_2417_Tr_5_12_Conf_0.500_Lgt_3050 m.617935	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_2417_Tr_6_12_Conf_0.630_Lgt_3255 m.617985	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_2417_Tr_7_12_Conf_0.609_Lgt_3266 m.618038	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_2417_Tr_8_12_Conf_0.630_Lgt_3253 m.618091	C-type lectin	1.60E-62	C-type lectin	3.30E-34	C-type lectin	7.90E-29
Eco_Loc_2417_Tr_9_12_Conf_0.630_Lgt_3253 m.618144	C-type lectin	1.20E-62	C-type lectin	1.60E-34	C-type lectin	3.90E-29
Eco_Loc_24248_Tr_1_7_Conf_0.684_Lgt_3058 m.3237136	--NA--	--NA--	--NA--	--NA--	C-type lectin	3.50E-15
Eco_Loc_24248_Tr_2_7_Conf_0.684_Lgt_3058 m.3237163	--NA--	--NA--	--NA--	--NA--	C-type lectin	3.50E-15
Eco_Loc_24248_Tr_3_7_Conf_0.684_Lgt_3058 m.3237190	--NA--	--NA--	--NA--	--NA--	C-type lectin	3.50E-15
Eco_Loc_24248_Tr_4_7_Conf_0.684_Lgt_3058 m.3237217	--NA--	--NA--	--NA--	--NA--	C-type lectin	3.50E-15
Eco_Loc_24248_Tr_5_7_Conf_0.684_Lgt_3058 m.3237246	--NA--	--NA--	--NA--	--NA--	C-type lectin	3.50E-15
Eco_Loc_24248_Tr_6_7_Conf_0.684_Lgt_3058 m.3237273	--NA--	--NA--	--NA--	--NA--	C-type lectin	3.50E-15
Eco_Loc_24248_Tr_7_7_Conf_0.684_Lgt_3058 m.3237299	--NA--	--NA--	--NA--	--NA--	C-type lectin	3.50E-15
Eco_Loc_2437_Tr_12_16_Conf_0.479_Lgt_4546 m.621791	Zinc metalloproteinase dpy-31	1.50E-81	Metalloproteinase M12	2.70E-20	Metalloproteinase M12	4.90E-17
Eco_Loc_24469_Tr_1_2_Conf_1.000_Lgt_1247 m.3250368	--NA--	--NA--	Metalloproteinase M12	6.50E-19	Metalloproteinase M12	3.00E-16
Eco_Loc_263_Tr_12_21_Conf_0.452_Lgt_3562 m.63562	Peptidase S1	1.60E-60	Peptidase S1	1.50E-46	Peptidase S1	8.70E-41
Eco_Loc_263_Tr_13_21_Conf_0.435_Lgt_3589 m.63610	Peptidase S1	1.60E-60	Peptidase S1	1.50E-46	Peptidase S1	8.70E-41
Eco_Loc_263_Tr_16_21_Conf_0.419_Lgt_3561 m.63702	Peptidase S1	1.60E-60	Peptidase S1	1.50E-46	Peptidase S1	8.70E-41
Eco_Loc_263_Tr_17_21_Conf_0.129_Lgt_1427 m.63751	Peptidase S1	3.40E-61	Peptidase S1	1.90E-46	Peptidase S1	1.30E-40
Eco_Loc_263_Tr_19_21_Conf_0.468_Lgt_3586 m.63797	Peptidase S1	1.60E-60	Peptidase S1	1.50E-46	Peptidase S1	8.70E-41
Eco_Loc_263_Tr_21_21_Conf_0.435_Lgt_3562 m.63862	Peptidase S1	1.60E-60	Peptidase S1	1.50E-46	Peptidase S1	8.70E-41
Eco_Loc_26425_Tr_3_7_Conf_0.478_Lgt_1716 m.3351062	--NA--	--NA--	C-type lectin	1.10E-18	C-type lectin	2.60E-15
Eco_Loc_26425_Tr_4_7_Conf_0.435_Lgt_1666 m.3351082	--NA--	--NA--	C-type lectin	2.70E-18	C-type lectin	6.50E-15
Eco_Loc_26425_Tr_5_7_Conf_0.478_Lgt_1618 m.3351102	--NA--	--NA--	C-type lectin	5.00E-20	C-type lectin	1.20E-16
Eco_Loc_26425_Tr_6_7_Conf_0.391_Lgt_1646 m.3351120	--NA--	--NA--	C-type lectin	7.00E-20	C-type lectin	1.60E-16
Eco_Loc_26425_Tr_7_7_Conf_0.391_Lgt_1646 m.3351140	--NA--	--NA--	C-type lectin	1.20E-18	C-type lectin	6.50E-15
Eco_Loc_2690_Tr_12_16_Conf_0.420_Lgt_2762 m.682842	--NA--	--NA--	Chitinase	5.90E-06	Chitinase	5.50E-07
Eco_Loc_2690_Tr_13_16_Conf_0.420_Lgt_2747 m.682887	--NA--	--NA--	Chitinase	5.90E-06	Chitinase	5.50E-07
Eco_Loc_2690_Tr_14_16_Conf_0.420_Lgt_2759 m.682931	--NA--	--NA--	Chitinase	5.90E-06	Chitinase	5.50E-07
Eco_Loc_2690_Tr_16_16_Conf_0.420_Lgt_2759 m.683002	--NA--	--NA--	Chitinase	5.90E-06	Chitinase	5.50E-07
Eco_Loc_282299_Tr_1_1_Conf_1.000_Lgt_354 m.6431510	--NA--	--NA--	CAP	3.80E-13	CAP	2.90E-10
Eco_Loc_29353_Tr_1_2_Conf_1.000_Lgt_1054 m.3488404	Zinc metalloproteinase-disintegrin-like cobrin	9.90E-24	Metalloproteinase M12	3.40E-24	Metalloproteinase M12	8.20E-20
Eco_Loc_29353_Tr_2_2_Conf_1.000_Lgt_1022 m.3488427	Zinc metalloproteinase-disintegrin-like cobrin	9.90E-24	Metalloproteinase M12	3.40E-24	Metalloproteinase M12	8.20E-20
Eco_Loc_29869_Tr_1_2_Conf_1.000_Lgt_793 m.3510682	C-type lectin lectoxin-Phi2	3.20E-12	C-type lectin	6.00E-24	C-type lectin	8.90E-20
Eco_Loc_3099_Tr_13_21_Conf_0.329_Lgt_2249 m.771958	--NA--	--NA--	--NA--	--NA--	ShK	2.40E-06
Eco_Loc_3099_Tr_16_21_Conf_0.329_Lgt_2249 m.772017	Shk-like	2.20E-33	--NA--	--NA--	ShK	2.40E-06
Eco_Loc_3099_Tr_21_21_Conf_0.329_Lgt_2249 m.772146	--NA--	--NA--	--NA--	--NA--	ShK	2.40E-06
Eco_Loc_311_Tr_10_11_Conf_0.513_Lgt_3700 m.74277	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	7.80E-12
Eco_Loc_311_Tr_11_11_Conf_0.615_Lgt_3695 m.74326	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	7.80E-12
Eco_Loc_311_Tr_2_11_Conf_0.462_Lgt_3327 m.74000	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	7.80E-12
Eco_Loc_311_Tr_3_11_Conf_0.615_Lgt_3696 m.74047	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	7.80E-12
Eco_Loc_311_Tr_4_11_Conf_0.615_Lgt_3695 m.74095	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	7.60E-12
Eco_Loc_311_Tr_5_11_Conf_0.615_Lgt_3695 m.74142	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	7.80E-12
Eco_Loc_311_Tr_7_11_Conf_0.231_Lgt_2090 m.74192	Zinc metalloproteinase dpy-31	8.40E-65	--NA--	--NA--	Metalloproteinase M12	4.70E-12
Eco_Loc_311_Tr_9_11_Conf_0.615_Lgt_3695 m.74231	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	7.80E-12
Eco_Loc_3264_Tr_1_2_Conf_1.000_Lgt_1284 m.813047	Natterin-4	1.10E-12	--NA--	--NA--	--NA--	--NA--
Eco_Loc_3264_Tr_2_2_Conf_1.000_Lgt_1282 m.813063	Natterin-4	4.50E-12	--NA--	--NA--	--NA--	--NA--
Eco_Loc_35431_Tr_1_2_Conf_1.000_Lgt_1430 m.3723492	--NA--	--NA--	Metalloproteinase M12	3.80E-22	Metalloproteinase M12	1.60E-08
Eco_Loc_35431_Tr_2_2_Conf_1.000_Lgt_1424 m.3723511	--NA--	--NA--	Metalloproteinase M12	2.90E-21	Metalloproteinase M12	1.20E-08
Eco_Loc_36182_Tr_1_1_Conf_1.000_Lgt_363 m.3748743	Peptidase S1	9.80E-19	Peptidase S1	1.70E-17	Peptidase S1	2.40E-13
Eco_Loc_361_Tr_10_17_Conf_0.427_Lgt_3221 m.85433	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_361_Tr_11_17_Conf_0.303_Lgt_2889 m.85479	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_361_Tr_12_17_Conf_0.416_Lgt_3221 m.85518	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_361_Tr_13_17_Conf_0.112_Lgt_938 m.85563	--NA--	--NA--	Cystatin	2.20E-20	Cystatin	2.30E-17
Eco_Loc_361_Tr_14_17_Conf_0.292_Lgt_2870 m.85575	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_361_Tr_15_17_Conf_0.427_Lgt_3220 m.85615	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_361_Tr_16_17_Conf_0.517_Lgt_3212 m.85658	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_361_Tr_17_17_Conf_0.438_Lgt_3221 m.85704	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_361_Tr_7_17_Conf_1.000_Lgt_234 m.85363	Cystatin-1	8.90E-12	Cystatin	6.60E-13	Cystatin	7.40E-09
Eco_Loc_361_Tr_8_17_Conf_0.371_Lgt_2860 m.85369	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_361_Tr_9_17_Conf_0.146_Lgt_1519 m.85410	Cystatin	5.30E-25	Cystatin	9.60E-26	Cystatin	1.30E-19
Eco_Loc_36797_Tr_6_11_Conf_0.194_Lgt_1032 m.3769281	--NA--	--NA--	Chitinase	5.80E-06	--NA--	--NA--
Eco_Loc_36797_Tr_7_11_Conf_0.222_Lgt_1538 m.3769293	--NA--	--NA--	Chitinase	5.20E-06	--NA--	--NA--
Eco_Loc_37268_Tr_4_6_Conf_0.455_Lgt_868 m.3783606	Metalloproteinase	6.20E-63	Metalloproteinase M12	7.00E-27	Metalloproteinase M12	8.50E-26
Eco_Loc_3764_Tr_26_29_Conf_0.269_Lgt_2525 m.916909	Kazal	4.80E-95	Kazal	3.10E-30	Kazal	4.20E-13
Eco_Loc_37762_Tr_1_2_Conf_0.300_Lgt_1537 m.3797852	--NA--	--NA--	--NA--	--NA--	C-type lectin	2.80E-06
Eco_Loc_37762_Tr_2_2_Conf_0.300_Lgt_1840 m.3797875	--NA--	--NA--	--NA--	--NA--	C-type lectin	3.80E-06

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
Eco_Loc_40409_Tr_1_1_Conf_1.000_Lgt_344 m.3875812	Phospholipase A2	4.80E-15	PhospholipaseA2	2.50E-06	PhospholipaseA2	3.50E-07
Eco_Loc_41396_Tr_1_7_Conf_0.650_Lgt_2316 m.3906602	C-type lectin	5.70E-11	C-type lectin	2.40E-25	C-type lectin	2.80E-22
Eco_Loc_41396_Tr_2_7_Conf_0.650_Lgt_2314 m.3906632	C-type lectin	5.70E-11	C-type lectin	2.40E-25	C-type lectin	2.80E-22
Eco_Loc_41396_Tr_3_7_Conf_0.650_Lgt_2304 m.3906662	--NA--	--NA--	C-type lectin	8.20E-23	C-type lectin	1.20E-18
Eco_Loc_41396_Tr_4_7_Conf_0.600_Lgt_2096 m.3906693	C-type lectin	5.50E-11	C-type lectin	4.60E-25	C-type lectin	2.80E-22
Eco_Loc_41396_Tr_5_7_Conf_0.650_Lgt_2314 m.3906718	C-type lectin	5.20E-11	C-type lectin	3.30E-25	C-type lectin	2.80E-22
Eco_Loc_41396_Tr_6_7_Conf_0.350_Lgt_1902 m.3906747	--NA--	--NA--	C-type lectin	8.20E-23	C-type lectin	1.20E-18
Eco_Loc_41396_Tr_7_7_Conf_0.650_Lgt_2314 m.3906776	C-type lectin	5.70E-11	C-type lectin	2.40E-25	C-type lectin	2.80E-22
Eco_Loc_4236_Tr_2_3_Conf_0.571_Lgt_1220 m.1018518	C-type lectin	6.90E-49	C-type lectin	8.30E-19	C-type lectin	3.70E-14
Eco_Loc_42537_Tr_1_4_Conf_0.455_Lgt_592 m.3936798	C-type lectin	6.10E-21	C-type lectin	3.60E-29	C-type lectin	7.70E-22
Eco_Loc_42537_Tr_2_4_Conf_0.455_Lgt_769 m.3936809	--NA--	--NA--	C-type lectin	4.20E-28	C-type lectin	9.20E-22
Eco_Loc_42537_Tr_3_4_Conf_0.455_Lgt_529 m.3936820	C-type lectin	6.60E-22	C-type lectin	1.30E-29	C-type lectin	5.60E-22
Eco_Loc_42537_Tr_4_4_Conf_0.455_Lgt_769 m.3936828	--NA--	--NA--	C-type lectin	5.90E-29	C-type lectin	9.20E-22
Eco_Loc_44386_Tr_2_3_Conf_0.500_Lgt_612 m.3984986	--NA--	--NA--	Peptidase S1	2.60E-15	Peptidase S1	3.20E-12
Eco_Loc_44695_Tr_1_1_Conf_1.000_Lgt_303 m.3992832	L-amino-acid oxidase	4.70E-13	--NA--	--NA--	--NA--	--NA--
Eco_Loc_44699_Tr_2_3_Conf_0.600_Lgt_726 m.3992899	--NA--	--NA--	C-type lectin	6.00E-31	C-type lectin	2.70E-21
Eco_Loc_45129_Tr_1_2_Conf_1.000_Lgt_973 m.4001379	--NA--	--NA--	--NA--	--NA--	C-type lectin	7.70E-06
Eco_Loc_45670_Tr_1_3_Conf_0.714_Lgt_486 m.4014352	Turriptide Gsg9.2	3.10E-12	Kazal	5.50E-17	Kazal	4.60E-14
Eco_Loc_45670_Tr_2_3_Conf_0.429_Lgt_486 m.4014360	Turriptide Lol9.1	2.30E-10	Kazal	9.10E-17	Kazal	7.90E-14
Eco_Loc_4574_Tr_19_28_Conf_0.636_Lgt_5393 m.1082796	Peptidase S10	--NA--	Peptidase S10	4.80E-101	Peptidase S10	1.80E-104
Eco_Loc_4574_Tr_22_28_Conf_0.628_Lgt_5393 m.1082992	Peptidase S10	--NA--	Peptidase S10	3.00E-101	Peptidase S10	1.40E-104
Eco_Loc_4574_Tr_23_28_Conf_0.231_Lgt_3575 m.1083075	Peptidase S10	--NA--	Peptidase S10	4.80E-101	Peptidase S10	1.80E-104
Eco_Loc_4574_Tr_24_28_Conf_0.587_Lgt_5248 m.1083134	Peptidase S10	--NA--	Peptidase S10	4.80E-101	Peptidase S10	1.80E-104
Eco_Loc_4574_Tr_28_28_Conf_0.636_Lgt_5393 m.1083347	Peptidase S10	--NA--	Peptidase S10	4.80E-101	Peptidase S10	1.80E-104
Eco_Loc_46199_Tr_1_2_Conf_1.000_Lgt_1351 m.4026618	--NA--	--NA--	CAP	4.10E-51	CAP	6.60E-34
Eco_Loc_46199_Tr_2_2_Conf_1.000_Lgt_1350 m.4026641	CAP	1.70E-31	CAP	1.80E-50	CAP	1.10E-33
Eco_Loc_47412_Tr_1_2_Conf_1.000_Lgt_655 m.4051214	Turriptide Lol9.1	3.60E-09	Kazal	8.30E-17	Kazal	6.40E-14
Eco_Loc_47412_Tr_2_2_Conf_1.000_Lgt_544 m.4051227	Turriptide Lol9.1	3.60E-09	Kazal	8.30E-17	Kazal	6.40E-14
Eco_Loc_47457_Tr_1_1_Conf_1.000_Lgt_312 m.4051810	Acetylcholinesterase-1	1.40E-13	--NA--	--NA--	--NA--	--NA--
Eco_Loc_4864_Tr_11_11_Conf_0.455_Lgt_3231 m.1148602	Toxin MIT1	1.50E-06	--NA--	--NA--	--NA--	--NA--
Eco_Loc_4864_Tr_3_11_Conf_0.455_Lgt_3234 m.1148261	Toxin MIT1	1.50E-06	--NA--	--NA--	--NA--	--NA--
Eco_Loc_4864_Tr_4_11_Conf_0.409_Lgt_3223 m.1148313	Toxin MIT1	1.50E-06	--NA--	--NA--	--NA--	--NA--
Eco_Loc_4864_Tr_6_11_Conf_0.477_Lgt_2935 m.1148378	Toxin MIT1	1.50E-06	--NA--	--NA--	--NA--	--NA--
Eco_Loc_4864_Tr_7_11_Conf_0.477_Lgt_3227 m.1148425	Toxin MIT1	1.50E-06	--NA--	--NA--	--NA--	--NA--
Eco_Loc_51083_Tr_1_1_Conf_1.000_Lgt_571 m.4125643	Zinc metalloproteinase nas-17	5.40E-10	--NA--	--NA--	--NA--	--NA--
Eco_Loc_5121_Tr_10_11_Conf_0.323_Lgt_1323 m.1199156	--NA--	--NA--	Lipocalin	3.60E-24	Lipocalin	3.30E-16
Eco_Loc_5121_Tr_11_11_Conf_0.323_Lgt_1465 m.1199174	--NA--	--NA--	Lipocalin	7.10E-24	Lipocalin	4.50E-16
Eco_Loc_5121_Tr_2_11_Conf_0.355_Lgt_1475 m.1199014	--NA--	--NA--	Lipocalin	3.60E-24	Lipocalin	3.30E-16
Eco_Loc_5121_Tr_3_11_Conf_0.387_Lgt_1466 m.1199034	--NA--	--NA--	Lipocalin	3.60E-24	Lipocalin	3.30E-16
Eco_Loc_5121_Tr_4_11_Conf_0.355_Lgt_1325 m.1199054	--NA--	--NA--	Lipocalin	5.80E-24	Lipocalin	4.00E-16
Eco_Loc_5121_Tr_5_11_Conf_0.355_Lgt_1473 m.1199073	--NA--	--NA--	Lipocalin	5.40E-24	Lipocalin	4.10E-16
Eco_Loc_5121_Tr_6_11_Conf_0.258_Lgt_1124 m.1199094	--NA--	--NA--	Lipocalin	5.40E-24	Lipocalin	4.10E-16
Eco_Loc_5121_Tr_7_11_Conf_0.323_Lgt_1465 m.1199108	--NA--	--NA--	Lipocalin	7.00E-24	Lipocalin	4.30E-16
Eco_Loc_5121_Tr_8_11_Conf_0.226_Lgt_1107 m.1199128	--NA--	--NA--	Lipocalin	7.10E-24	Lipocalin	4.80E-16
Eco_Loc_5121_Tr_9_11_Conf_0.290_Lgt_1140 m.1199141	--NA--	--NA--	Lipocalin	5.80E-24	Lipocalin	4.00E-16
Eco_Loc_5365_Tr_10_13_Conf_0.413_Lgt_4738 m.1247658	--NA--	--NA--	C-type lectin	1.50E-20	C-type lectin	5.80E-15
Eco_Loc_5365_Tr_11_13_Conf_0.348_Lgt_3072 m.1247722	--NA--	--NA--	C-type lectin	1.50E-20	C-type lectin	5.80E-15
Eco_Loc_5365_Tr_4_13_Conf_0.348_Lgt_3081 m.1247432	--NA--	--NA--	C-type lectin	1.30E-20	C-type lectin	5.80E-15
Eco_Loc_5365_Tr_5_13_Conf_0.370_Lgt_3081 m.1247473	--NA--	--NA--	C-type lectin	1.50E-20	C-type lectin	5.80E-15
Eco_Loc_5365_Tr_6_13_Conf_0.348_Lgt_3082 m.1247515	--NA--	--NA--	C-type lectin	1.50E-20	C-type lectin	5.80E-15
Eco_Loc_5365_Tr_7_13_Conf_0.348_Lgt_3081 m.1247556	--NA--	--NA--	C-type lectin	1.30E-20	C-type lectin	5.80E-15
Eco_Loc_5365_Tr_9_13_Conf_0.348_Lgt_3079 m.1247620	--NA--	--NA--	C-type lectin	1.70E-18	C-type lectin	3.30E-13
Eco_Loc_53896_Tr_1_5_Conf_0.455_Lgt_674 m.4183024	--NA--	--NA--	C-type lectin	2.50E-24	C-type lectin	6.50E-18
Eco_Loc_53896_Tr_2_5_Conf_0.364_Lgt_734 m.4183031	--NA--	--NA--	C-type lectin	5.80E-22	C-type lectin	8.50E-16
Eco_Loc_53896_Tr_3_5_Conf_0.364_Lgt_594 m.4183041	--NA--	--NA--	C-type lectin	1.40E-23	C-type lectin	6.50E-18
Eco_Loc_53896_Tr_4_5_Conf_0.364_Lgt_594 m.4183047	--NA--	--NA--	C-type lectin	2.20E-24	C-type lectin	6.50E-18
Eco_Loc_53896_Tr_5_5_Conf_0.364_Lgt_678 m.4183053	--NA--	--NA--	C-type lectin	5.10E-21	C-type lectin	6.50E-15
Eco_Loc_5468_Tr_18_24_Conf_0.410_Lgt_3081 m.1267286	Kunitz-type U19-barytoxin-T11a	1.60E-25	Kunitz	6.20E-27	Kunitz	2.90E-21
Eco_Loc_5468_Tr_19_24_Conf_0.410_Lgt_3079 m.1267337	Kunitz-type U19-barytoxin-T11a	1.60E-25	Kunitz	9.00E-26	Kunitz	2.90E-21
Eco_Loc_5468_Tr_20_24_Conf_0.426_Lgt_3079 m.1267385	Kunitz-type U19-barytoxin-T11a	1.50E-25	Kunitz	6.20E-27	Kunitz	2.90E-21
Eco_Loc_5468_Tr_22_24_Conf_0.377_Lgt_3079 m.1267470	Kunitz-type U19-barytoxin-T11a	1.70E-25	Kunitz	1.30E-22	Kunitz	2.90E-21
Eco_Loc_5468_Tr_23_24_Conf_0.443_Lgt_3296 m.1267518	Kunitz-type U19-barytoxin-T11a	1.60E-25	Kunitz	6.20E-27	Kunitz	2.90E-21
Eco_Loc_5468_Tr_24_24_Conf_0.410_Lgt_3079 m.1267570	Kunitz-type U19-barytoxin-T11a	1.60E-25	Kunitz	6.20E-27	Kunitz	2.90E-21
Eco_Loc_5747_Tr_1_8_Conf_0.708_Lgt_1920 m.1316419	C-type lectin	3.20E-43	C-type lectin	4.30E-21	C-type lectin	2.00E-16
Eco_Loc_5747_Tr_2_8_Conf_0.667_Lgt_1761 m.1316443	C-type lectin	1.90E-43	C-type lectin	1.70E-21	C-type lectin	1.90E-16
Eco_Loc_5747_Tr_3_8_Conf_0.708_Lgt_1914 m.1316466	C-type lectin	3.40E-43	C-type lectin	4.30E-21	C-type lectin	2.00E-16
Eco_Loc_5747_Tr_4_8_Conf_0.708_Lgt_1914 m.1316490	C-type lectin	3.10E-43	C-type lectin	4.30E-21	C-type lectin	2.00E-16
Eco_Loc_5747_Tr_5_8_Conf_0.667_Lgt_1914 m.1316514	C-type lectin	3.40E-43	C-type lectin	8.60E-21	C-type lectin	2.80E-16
Eco_Loc_5747_Tr_6_8_Conf_0.625_Lgt_1914 m.1316538	C-type lectin	3.30E-43	C-type lectin	4.30E-21	C-type lectin	2.00E-16
Eco_Loc_5747_Tr_7_8_Conf_0.708_Lgt_1914 m.1316561	C-type lectin	3.10E-43	C-type lectin	4.30E-21	C-type lectin	2.00E-16
Eco_Loc_5747_Tr_8_8_Conf_0.708_Lgt_1914 m.1316585	C-type lectin	3.20E-43	C-type lectin	4.30E-21	C-type lectin	2.00E-16
Eco_Loc_58382_Tr_2_4_Conf_0.700_Lgt_1223 m.4281647	Peptidase S1	9.50E-23	Peptidase S1	9.60E-38	Peptidase S1	6.80E-34
Eco_Loc_58382_Tr_3_4_Conf_0.700_Lgt_1223 m.4281665	Peptidase S1	1.00E-22	Peptidase S1	6.10E-38	Peptidase S1	4.10E-34
Eco_Loc_58382_Tr_4_4_Conf_0.700_Lgt_1223 m.4281682	Peptidase S1	9.10E-23	Peptidase S1	8.30E-38	Peptidase S1	6.80E-34
Eco_Loc_58536_Tr_10_10_Conf_0.556_Lgt_1469 m.4289004	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_1_10_Conf_0.556_Lgt_1469 m.4288839	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_2_10_Conf_0.556_Lgt_1424 m.4288857	--NA--	--NA--	Hainantoxin	3.50E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_3_10_Conf_0.519_Lgt_1464 m.4288877	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_4_10_Conf_0.481_Lgt_1473 m.4288895	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_5_10_Conf_0.481_Lgt_1473 m.4288915	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_6_10_Conf_0.556_Lgt_1589 m.4288933	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_7_10_Conf_0.481_Lgt_1469 m.4288952	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_8_10_Conf_0.370_Lgt_1321 m.4288970	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_58536_Tr_9_10_Conf_0.407_Lgt_1234 m.4288988	--NA--	--NA--	Hainantoxin	7.10E-09	Hainantoxin	2.50E-06
Eco_Loc_60538_Tr_2_6_Conf_0.688_Lgt_904 m.4367150	Equistatin	2.20E-11	--NA--	--NA--	--NA--	--NA--
Eco_Loc_60538_Tr_3_6_Conf_0.688_Lgt_859 m.4367162	Equistatin	1.70E-11	--NA--	--NA--	--NA--	--NA--
Eco_Loc_60538_Tr_4_6_Conf_0.625_Lgt_844 m.4367174	Equistatin	1.40E-11	--NA--	--NA--	--NA--	--NA--
Eco_Loc_60538_Tr_6_6_Conf_0.688_Lgt_850 m.4367198	Equistatin	1.60E-11	--NA--	--NA--	--NA--	--NA--
Eco_Loc_61364_Tr_1_1_Conf_1.000_Lgt_654 m.4391960	--NA--	--NA--	C-type lectin	1.40E-22	C-type lectin	4.20E-17
Eco_Loc_61555_Tr_1_1_Conf_1.000_Lgt_818 m.4399641	--NA--	--NA--	C-type lectin	3.80E-28	C-type lectin	9.50E-22
Eco_Loc_62193_Tr_1_2_Conf_1.000_Lgt_991 m.4421152	--NA--	--NA--	CAP	1.40E-34	CAP	5.90E-24
Eco_Loc_62675_Tr_3_4_Conf_0.214_Lgt_1520 m.4435709	--NA--	--NA--	Agatoxin	8.30E-07	--NA--	--NA--
Eco_Loc_62675_Tr_4_4_Conf_0.643_Lgt_1028 m.4435738	--NA--	--NA--	Hainantoxin	1.40E-07	Hainantoxin	7.80E-06

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
Eco_Loc_62686_Tr_1_6_Conf_0.500_Lgt_2382 m.4435880	Basic phospholipase A2 notechis 11'2	1.10E-23	PhospholipaseA2	1.20E-15	PhospholipaseA2	2.00E-19
Eco_Loc_62686_Tr_2_6_Conf_0.643_Lgt_2630 m.4435911	Basic phospholipase A2 notechis 11'2	1.10E-23	PhospholipaseA2	1.20E-15	PhospholipaseA2	2.00E-19
Eco_Loc_62686_Tr_3_6_Conf_0.571_Lgt_2623 m.4435942	Basic phospholipase A2 notechis 11'2	3.00E-23	PhospholipaseA2	1.00E-15	PhospholipaseA2	2.00E-19
Eco_Loc_62686_Tr_4_6_Conf_0.643_Lgt_1726 m.4435972	Basic phospholipase A2 notechis 11'2	1.10E-23	PhospholipaseA2	1.20E-15	PhospholipaseA2	2.00E-19
Eco_Loc_62686_Tr_5_6_Conf_0.643_Lgt_2617 m.4435993	Basic phospholipase A2 notechis 11'2	1.10E-23	PhospholipaseA2	1.20E-15	PhospholipaseA2	2.00E-19
Eco_Loc_62686_Tr_6_6_Conf_0.643_Lgt_2619 m.4436028	Basic phospholipase A2 notechis 11'2	1.10E-23	PhospholipaseA2	1.20E-15	PhospholipaseA2	2.00E-19
Eco_Loc_6398_Tr_34_43_Conf_0.177_Lgt_2382 m.1435154	C-type lectin	1.20E-12	C-type lectin	2.90E-31	C-type lectin	3.80E-24
Eco_Loc_6398_Tr_39_43_Conf_0.177_Lgt_2380 m.1435414	C-type lectin	1.20E-12	C-type lectin	2.90E-31	C-type lectin	3.80E-24
Eco_Loc_64374_Tr_1_2_Conf_1.000_Lgt_1274 m.4486589	--NA--	--NA--	C-type lectin	1.30E-17	C-type lectin	2.30E-12
Eco_Loc_64524_Tr_1_1_Conf_1.000_Lgt_500 m.4491498	Veficolin-1	8.70E-20	--NA--	--NA--	--NA--	--NA--
Eco_Loc_65547_Tr_1_2_Conf_1.000_Lgt_740 m.4517595	C-type lectin	1.60E-09	C-type lectin	3.70E-23	C-type lectin	5.20E-17
Eco_Loc_66737_Tr_1_1_Conf_1.000_Lgt_414 m.4546543	Venom protein 302	6.40E-08	--NA--	--NA--	--NA--	--NA--
Eco_Loc_67426_Tr_3_11_Conf_0.282_Lgt_695 m.4564009	--NA--	--NA--	Delta conotoxin	6.10E-06	--NA--	--NA--
Eco_Loc_6847_Tr_31_33_Conf_0.302_Lgt_2385 m.1511179	Auswaprin-a	2.20E-07	Chitinase	3.10E-06	--NA--	--NA--
Eco_Loc_6847_Tr_33_33_Conf_0.317_Lgt_2384 m.1511227	Auswaprin-a	2.20E-07	Chitinase	3.10E-06	--NA--	--NA--
Eco_Loc_6979_Tr_16_22_Conf_0.139_Lgt_1499 m.1536193	--NA--	--NA--	Chitinase	1.70E-26	Chitinase	4.50E-27
Eco_Loc_6979_Tr_19_22_Conf_0.304_Lgt_4570 m.1536269	--NA--	--NA--	Chitinase	1.60E-26	Chitinase	4.50E-27
Eco_Loc_6979_Tr_20_22_Conf_0.215_Lgt_3745 m.1536344	--NA--	--NA--	Chitinase	1.60E-26	Chitinase	4.50E-27
Eco_Loc_6979_Tr_22_22_Conf_0.139_Lgt_1531 m.1536455	--NA--	--NA--	Chitinase	1.70E-26	Chitinase	4.50E-27
Eco_Loc_70866_Tr_1_4_Conf_0.625_Lgt_1184 m.4642827	Metalloproteinase	3.40E-44	Metalloproteinase M12	1.10E-20	Metalloproteinase M12	7.20E-20
Eco_Loc_70866_Tr_2_4_Conf_0.625_Lgt_1237 m.4642848	Metalloproteinase	8.30E-45	Metalloproteinase M12	1.70E-21	Metalloproteinase M12	1.20E-20
Eco_Loc_70866_Tr_3_4_Conf_0.500_Lgt_1196 m.4642869	Metalloproteinase	9.20E-45	Metalloproteinase M12	2.40E-21	Metalloproteinase M12	2.20E-20
Eco_Loc_70866_Tr_4_4_Conf_0.625_Lgt_1237 m.4642889	Metalloproteinase	3.40E-44	Metalloproteinase M12	1.10E-20	Metalloproteinase M12	7.20E-20
Eco_Loc_71327_Tr_1_1_Conf_1.000_Lgt_827 m.4651396	--NA--	--NA--	Delta conotoxin	3.40E-06	--NA--	--NA--
Eco_Loc_7304_Tr_19_27_Conf_0.460_Lgt_6584 m.1592123	--NA--	--NA--	C-type lectin	2.10E-36	C-type lectin	3.60E-28
Eco_Loc_7304_Tr_20_27_Conf_0.238_Lgt_3551 m.1592223	--NA--	--NA--	C-type lectin	2.10E-36	C-type lectin	3.60E-28
Eco_Loc_7304_Tr_21_27_Conf_0.460_Lgt_6589 m.1592282	--NA--	--NA--	C-type lectin	2.10E-36	C-type lectin	3.60E-28
Eco_Loc_7304_Tr_22_27_Conf_0.429_Lgt_6599 m.1592382	--NA--	--NA--	C-type lectin	2.10E-36	C-type lectin	3.60E-28
Eco_Loc_7304_Tr_24_27_Conf_0.167_Lgt_2620 m.1592494	--NA--	--NA--	C-type lectin	2.10E-36	C-type lectin	3.60E-28
Eco_Loc_7304_Tr_25_27_Conf_0.460_Lgt_6602 m.1592545	--NA--	--NA--	C-type lectin	2.10E-36	C-type lectin	3.60E-28
Eco_Loc_7304_Tr_26_27_Conf_0.238_Lgt_3427 m.1592643	--NA--	--NA--	C-type lectin	2.10E-36	C-type lectin	3.60E-28
Eco_Loc_7304_Tr_27_27_Conf_0.460_Lgt_6589 m.1592695	--NA--	--NA--	C-type lectin	2.10E-36	C-type lectin	3.60E-28
Eco_Loc_73638_Tr_1_1_Conf_1.000_Lgt_684 m.4696684	Phospholipase D LiSiCTox-beta1D1	7.70E-29	--NA--	--NA--	--NA--	--NA--
Eco_Loc_7671_Tr_16_17_Conf_0.371_Lgt_2915 m.1652139	Plancitoxin-1	1.70E-100	--NA--	--NA--	--NA--	--NA--
Eco_Loc_7671_Tr_4_17_Conf_1.000_Lgt_222 m.1651924	Plancitoxin-1	3.40E-14	--NA--	--NA--	--NA--	--NA--
Eco_Loc_77067_Tr_1_3_Conf_0.778_Lgt_1278 m.4753909	--NA--	--NA--	Metalloproteinase M12	2.40E-20	Metalloproteinase M12	3.80E-17
Eco_Loc_77067_Tr_2_3_Conf_0.667_Lgt_1293 m.4753929	--NA--	--NA--	Metalloproteinase M12	3.40E-20	Metalloproteinase M12	3.80E-17
Eco_Loc_77067_Tr_3_3_Conf_0.778_Lgt_1278 m.4753951	--NA--	--NA--	Metalloproteinase M12	2.40E-20	Metalloproteinase M12	3.80E-17
Eco_Loc_80402_Tr_1_1_Conf_1.000_Lgt_432 m.4803433	Venom carboxylesterase-6	2.20E-08	--NA--	--NA--	--NA--	--NA--
Eco_Loc_8184_Tr_12_12_Conf_0.333_Lgt_1471 m.1737410	--NA--	--NA--	C-type lectin	2.40E-17	C-type lectin	1.60E-14
Eco_Loc_8184_Tr_3_12_Conf_0.333_Lgt_1471 m.1737276	--NA--	--NA--	C-type lectin	7.30E-18	C-type lectin	6.00E-15
Eco_Loc_8184_Tr_5_12_Conf_0.154_Lgt_850 m.1737306	--NA--	--NA--	C-type lectin	1.50E-17	C-type lectin	1.10E-14
Eco_Loc_8184_Tr_6_12_Conf_0.385_Lgt_1556 m.1737319	--NA--	--NA--	C-type lectin	4.60E-19	C-type lectin	6.00E-16
Eco_Loc_8184_Tr_8_12_Conf_0.128_Lgt_456 m.1737349	Snaclec rhodocetin subunit delta	4.50E-07	C-type lectin	2.70E-09	C-type lectin	2.40E-07
Eco_Loc_8184_Tr_9_12_Conf_0.308_Lgt_1471 m.1737354	--NA--	--NA--	C-type lectin	2.40E-17	C-type lectin	1.60E-14
Eco_Loc_84064_Tr_1_5_Conf_0.500_Lgt_1118 m.4853329	--NA--	--NA--	Metalloproteinase M12	1.00E-18	Metalloproteinase M12	4.90E-18
Eco_Loc_84064_Tr_2_5_Conf_0.357_Lgt_856 m.4853342	--NA--	--NA--	Metalloproteinase M12	2.90E-17	Metalloproteinase M12	2.50E-18
Eco_Loc_84064_Tr_4_5_Conf_0.286_Lgt_959 m.4853364	--NA--	--NA--	Metalloproteinase M12	3.10E-17	Metalloproteinase M12	2.30E-17
Eco_Loc_84064_Tr_5_5_Conf_0.571_Lgt_1202 m.4853376	--NA--	--NA--	Metalloproteinase M12	1.40E-18	Metalloproteinase M12	4.90E-18
Eco_Loc_86741_Tr_10_10_Conf_0.567_Lgt_1687 m.4887561	--NA--	--NA--	Kazal	2.90E-16	Kazal	2.10E-11
Eco_Loc_86741_Tr_1_10_Conf_0.633_Lgt_1818 m.4887386	--NA--	--NA--	Kazal	2.70E-16	Kazal	2.30E-11
Eco_Loc_86741_Tr_2_10_Conf_0.133_Lgt_500 m.4887410	--NA--	--NA--	Kazal	7.00E-15	Kazal	2.60E-11
Eco_Loc_86741_Tr_4_10_Conf_0.600_Lgt_1818 m.4887426	--NA--	--NA--	Kazal	2.50E-16	Kazal	2.10E-11
Eco_Loc_86741_Tr_5_10_Conf_0.567_Lgt_1687 m.4887450	--NA--	--NA--	Kazal	3.00E-16	Kazal	2.80E-11
Eco_Loc_86741_Tr_6_10_Conf_0.600_Lgt_1687 m.4887473	--NA--	--NA--	Kazal	9.90E-16	Kazal	2.10E-11
Eco_Loc_86741_Tr_7_10_Conf_0.300_Lgt_1395 m.4887497	--NA--	--NA--	Kazal	2.90E-16	Kazal	2.10E-11
Eco_Loc_86741_Tr_8_10_Conf_0.567_Lgt_1687 m.4887514	--NA--	--NA--	Kazal	2.90E-16	Kazal	2.10E-11
Eco_Loc_86741_Tr_9_10_Conf_0.600_Lgt_1765 m.4887539	--NA--	--NA--	Kazal	3.10E-16	Kazal	1.60E-11
Eco_Loc_8726_Tr_1_4_Conf_0.286_Lgt_687 m.1814197	--NA--	--NA--	C-type lectin	1.30E-11	C-type lectin	1.20E-07
Eco_Loc_8726_Tr_2_4_Conf_0.571_Lgt_583 m.1814213	Salivary C-type lectin	6.20E-12	C-type lectin	8.50E-22	C-type lectin	5.00E-17
Eco_Loc_8726_Tr_4_4_Conf_0.571_Lgt_583 m.1814241	--NA--	--NA--	C-type lectin	5.80E-23	C-type lectin	3.10E-18
Eco_Loc_90241_Tr_1_1_Conf_1.000_Lgt_508 m.4926145	C-type lectin	4.00E-23	C-type lectin	2.80E-33	C-type lectin	3.00E-24
Eco_Loc_913_Tr_2_9_Conf_0.233_Lgt_762 m.235957	--NA--	--NA--	C-type lectin	6.10E-14	C-type lectin	1.30E-07
Eco_Loc_913_Tr_3_9_Conf_0.433_Lgt_750 m.235970	C-type lectin	2.40E-11	C-type lectin	4.10E-27	C-type lectin	3.70E-20
Eco_Loc_913_Tr_4_9_Conf_0.333_Lgt_764 m.235982	C-type lectin	2.40E-08	C-type lectin	2.50E-16	C-type lectin	2.40E-09
Eco_Loc_913_Tr_7_9_Conf_0.400_Lgt_750 m.236011	C-type lectin	7.90E-11	C-type lectin	1.60E-28	C-type lectin	2.00E-20
Eco_Loc_913_Tr_9_9_Conf_0.467_Lgt_750 m.236032	--NA--	--NA--	C-type lectin	1.20E-28	C-type lectin	3.70E-21
Eco_Loc_92360_Tr_1_2_Conf_1.000_Lgt_532 m.4954675	--NA--	--NA--	CAP	7.70E-28	CAP	2.60E-21
Eco_Loc_92360_Tr_2_2_Conf_1.000_Lgt_532 m.4954686	--NA--	--NA--	CAP	3.60E-27	CAP	3.50E-21
Eco_Loc_94963_Tr_2_3_Conf_0.667_Lgt_1109 m.5006883	ArgT64	1.70E-21	--NA--	--NA--	--NA--	--NA--
Eco_Loc_95783_Tr_1_3_Conf_0.667_Lgt_948 m.5020170	Snaclec salmorin subunit A	4.10E-14	C-type lectin	1.60E-22	C-type lectin	1.10E-18
Eco_Loc_95783_Tr_2_3_Conf_0.667_Lgt_1035 m.5020180	Snaclec salmorin subunit A	6.50E-14	C-type lectin	2.20E-22	C-type lectin	1.40E-18
Eco_Loc_95783_Tr_3_3_Conf_0.667_Lgt_1035 m.5020192	Snaclec salmorin subunit A	6.50E-14	C-type lectin	2.20E-22	C-type lectin	1.40E-18
Eco_Loc_962_Tr_10_12_Conf_0.350_Lgt_1842 m.247908	C-type lectin	3.40E-12	C-type lectin	5.70E-21	C-type lectin	4.00E-16
Eco_Loc_962_Tr_11_12_Conf_0.575_Lgt_3783 m.247934	C-type lectin	1.10E-12	C-type lectin	9.60E-21	C-type lectin	7.80E-16
Eco_Loc_962_Tr_12_12_Conf_0.600_Lgt_3783 m.247987	C-type lectin	1.10E-12	C-type lectin	9.60E-21	C-type lectin	7.80E-16
Eco_Loc_962_Tr_3_12_Conf_0.600_Lgt_3783 m.247564	C-type lectin	1.10E-12	C-type lectin	9.60E-21	C-type lectin	7.80E-16
Eco_Loc_962_Tr_4_12_Conf_0.375_Lgt_1842 m.247617	C-type lectin	4.20E-12	C-type lectin	4.60E-21	C-type lectin	4.00E-16
Eco_Loc_962_Tr_5_12_Conf_0.600_Lgt_3783 m.247643	C-type lectin	1.10E-12	C-type lectin	9.60E-21	C-type lectin	7.80E-16
Eco_Loc_962_Tr_6_12_Conf_0.575_Lgt_3783 m.247695	C-type lectin	1.10E-12	C-type lectin	9.60E-21	C-type lectin	7.80E-16
Eco_Loc_962_Tr_7_12_Conf_0.600_Lgt_3783 m.247749	C-type lectin	1.10E-12	C-type lectin	9.60E-21	C-type lectin	7.80E-16
Eco_Loc_962_Tr_8_12_Conf_0.600_Lgt_3783 m.247802	C-type lectin	1.10E-12	C-type lectin	9.60E-21	C-type lectin	7.80E-16
Eco_Loc_962_Tr_9_12_Conf_0.600_Lgt_3783 m.247855	C-type lectin	1.10E-12	C-type lectin	9.60E-21	C-type lectin	7.80E-16
Eco_Loc_97117_Tr_1_1_Conf_1.000_Lgt_1052 m.5040295	C-type lectin	7.90E-19	C-type lectin	4.20E-35	C-type lectin	2.40E-27
Eco_Loc_97464_Tr_1_1_Conf_1.000_Lgt_286 m.5044991	--NA--	--NA--	Kazal	2.50E-07	Kazal	5.60E-07
Eco_Loc_97608_Tr_1_1_Conf_1.000_Lgt_583 m.5047274	Secreted salivary protein	5.90E-20	CAP	8.30E-28	CAP	1.80E-21
Eco_Loc_9826_Tr_1_1_Conf_1.000_Lgt_729 m.1974748	--NA--	--NA--	C-type lectin	3.90E-25	C-type lectin	2.20E-17
Eco_Loc_98311_Tr_1_1_Conf_1.000_Lgt_828 m.5057417	CAP	8.20E-15	CAP	4.80E-24	CAP	4.90E-18

Supplementary Material online

Are fireworms venomous? Evidence for the convergent evolution of toxin homologs in three species of fireworms (Annelida, Amphinomidae).

Aida Verdes, Danny Simpson and Mandë Holford

Supplementary Material includes:

Supplementary file S1: supplementary tables S1–S3, supplementary figures S1–S7.

Supplementary file S2: toxin homologs identified in *Eurythoe complanata*.

Supplementary file S3: toxin homologs identified in *Hermodice carunculata*.

Supplementary file S4: toxin homologs identified in *Paramphinome jeffreysii*.

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
TR10460 c0_g1_i1 m.472584	--NA--	--NA--	Peptidase S1	4.10E-64	Peptidase S1	6.20E-56
TR10522 c0_g1_i1 m.473417	Snake venom 5 nucleotidase	5.70E-26	--NA--	--NA--	--NA--	--NA--
TR1114 c0_g1_i1 m.63697	Peptidase S10	2.60E-148	Peptidase S10	2.70E-101	Peptidase S10	1.90E-103
TR11399 c6_g2_i1 m.533507	Peptidase S1	2.80E-69	--NA--	--NA--	--NA--	--NA--
TR1169 c0_g2_i1 m.68108	--NA--	--NA--	C-type lectin	3.10E-16	C-type lectin	2.80E-09
TR1169 c0_g2_i1 m.68108	--NA--	--NA--	C-type lectin	3.10E-16	Metalloproteinase M12	1.80E-19
TR1169 c0_g2_i1 m.68108	--NA--	--NA--	Metalloproteinase M12	1.50E-22	C-type lectin	2.80E-09
TR1169 c0_g2_i1 m.68108	--NA--	--NA--	Metalloproteinase M12	1.50E-22	Metalloproteinase M12	1.80E-19
TR117681 c0_g1_i1 m.3987732	--NA--	--NA--	C-type lectin	4.90E-06	--NA--	--NA--
TR117744 c0_g1_i1 m.3988200	--NA--	--NA--	C-type lectin	9.40E-26	C-type lectin	2.80E-16
TR11860 c3_g1_i1 m.561228	Techylectin-like protein	1.30E-46	--NA--	--NA--	--NA--	--NA--
TR11866 c3_g1_i1 m.562875	--NA--	--NA--	C-type lectin	5.50E-24	C-type lectin	7.20E-20
TR121700 c0_g1_i1 m.4014306	--NA--	--NA--	Peptidase S1	8.80E-07	Peptidase S1	5.90E-07
TR12571 c0_g1_i1 m.598870	Techylectin-like protein	4.50E-56	--NA--	--NA--	--NA--	--NA--
TR1274 c1_g5_i1 m.72591	--NA--	--NA--	C-type lectin	3.90E-13	C-type lectin	1.40E-06
TR1274 c1_g5_i2 m.72608	--NA--	--NA--	C-type lectin	1.30E-15	C-type lectin	6.80E-08
TR1274 c1_g5_i3 m.72615	--NA--	--NA--	C-type lectin	4.00E-20	C-type lectin	1.70E-12
TR1274 c1_g5_i5 m.72640	--NA--	--NA--	C-type lectin	3.10E-20	C-type lectin	3.20E-13
TR1288 c1_g1_i1 m.75395	M-zodatoxin-Lt6a	7.60E-71	--NA--	--NA--	--NA--	--NA--
TR14059 c0_g1_i1 m.655674	Chitinase	3.10E-148	Chitinase	3.30E-152	Chitinase	2.00E-141
TR14451 c0_g1_i1 m.678978	--NA--	--NA--	Peptidase S1	1.60E-52	Peptidase S1	1.20E-44
TR15231 c1_g1_i1 m.714544	--NA--	--NA--	Cystatin	2.30E-13	Cystatin	8.30E-12
TR16493 c3_g1_i1 m.749336	--NA--	--NA--	--NA--	--NA--	ShK-like	1.00E-07
TR16558 c3_g1_i2 m.763593	--NA--	--NA--	C-type lectin	6.70E-21	C-type lectin	2.90E-14
TR16558 c3_g1_i4 m.763864	--NA--	--NA--	C-type lectin	6.70E-21	C-type lectin	2.90E-14
TR16746 c1_g1_i1 m.783083	--NA--	--NA--	C-type lectin	2.60E-35	C-type lectin	3.40E-26
TR1699 c1_g1_i1 m.97872	--NA--	--NA--	Peptidase S1	1.70E-73	Peptidase S1	1.50E-63
TR1699 c1_g1_i2 m.97885	Peptidase S1	1.70E-47	Peptidase S1	1.20E-64	Peptidase S1	1.40E-55
TR18585 c0_g1_i1 m.873166	--NA--	--NA--	Chitinase	1.40E-20	Chitinase	5.20E-17
TR18940 c0_g1_i1 m.879597	Peptidase S1	1.40E-68	Peptidase S1	4.40E-50	Peptidase S1	7.20E-44
TR18940 c0_g1_i2 m.879608	Peptidase S1	1.40E-68	Peptidase S1	4.40E-50	Peptidase S1	7.20E-44
TR18940 c0_g1_i3 m.879619	Peptidase S1	7.40E-62	Peptidase S1	1.10E-50	Peptidase S1	2.00E-44
TR18940 c0_g1_i5 m.879641	Peptidase S1	7.40E-62	Peptidase S1	1.10E-50	Peptidase S1	2.00E-44
TR19537 c0_g1_i1 m.893443	--NA--	--NA--	Kunitz	1.40E-40	Kunitz	2.00E-23
TR19537 c0_g1_i1 m.893444	--NA--	--NA--	Kunitz	3.50E-24	Kunitz	2.10E-22
TR19537 c0_g1_i2 m.893541	--NA--	--NA--	Kunitz	1.10E-40	Kunitz	2.90E-23
TR19537 c0_g1_i2 m.893542	--NA--	--NA--	Kunitz	1.40E-44	Kunitz	2.80E-23
TR19537 c0_g1_i2 m.893547	--NA--	--NA--	Kunitz	1.10E-22	Kunitz	1.40E-22
TR19537 c0_g1_i3 m.893708	Kunitz-type serine protease inhibitor	9.00E-31	Kunitz	1.10E-40	Kunitz	1.90E-23
TR19537 c0_g1_i3 m.893709	--NA--	--NA--	Kunitz	1.40E-44	Kunitz	2.80E-23
TR19537 c0_g1_i3 m.893714	--NA--	--NA--	Kunitz	1.10E-22	Kunitz	1.40E-22
TR20813 c0_g1_i1 m.954798	--NA--	--NA--	Metalloproteinase M12	2.00E-17	Metalloproteinase M12	2.20E-18
TR21069 c6_g3_i6 m.986794	Zinc metalloproteinase - nematode astacin	2.80E-33	C-type lectin	4.10E-18	C-type lectin	1.50E-10
TR21069 c6_g3_i9 m.986827	C-type lectin lectoxin-Lio3	5.60E-13	C-type lectin	2.50E-25	C-type lectin	3.70E-16
TR21764 c1_g1_i1 m.1049316	--NA--	--NA--	Lipocalin	4.70E-24	Lipocalin	3.10E-16
TR21867 c4_g2_i12 m.1060408	--NA--	--NA--	C-type lectin	7.40E-07	--NA--	--NA--

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
TR21867 c4_g2_i5 m.1060161	--NA--	--NA--	C-type lectin	9.20E-07	--NA--	--NA--
TR22580 c0_g1_i1 m.1082283	Techylectin-like protein	2.20E-38	--NA--	--NA--	--NA--	--NA--
TR22637 c0_g2_i1 m.1085686	--NA--	--NA--	C-type lectin	3.30E-16	C-type lectin	8.40E-13
TR22637 c0_g2_i2 m.1085697	--NA--	--NA--	C-type lectin	5.40E-16	C-type lectin	1.30E-12
TR22821 c0_g1_i1 m.1121750	--NA--	--NA--	C-type lectin	7.30E-10	C-type lectin	1.30E-08
TR22821 c0_g2_i1 m.1121761	--NA--	--NA--	C-type lectin	6.70E-10	C-type lectin	1.30E-08
TR22822 c0_g1_i2 m.1121796	--NA--	--NA--	C-type lectin	4.00E-14	C-type lectin	1.80E-09
TR22971 c2_g1_i1 m.1138207	--NA--	--NA--	Metalloproteinase M12	2.50E-21	Metalloproteinase M12	4.10E-20
TR23627 c5_g1_i1 m.1159068	Kunitz-type serine protease inhibitor	3.30E-19	Kunitz	2.50E-22	Kunitz	1.30E-21
TR23662 c0_g1_i1 m.1165260	--NA--	--NA--	C-type lectin	7.90E-26	C-type lectin	1.40E-18
TR23662 c0_g1_i2 m.1165312	--NA--	--NA--	C-type lectin	1.80E-25	C-type lectin	2.00E-18
TR2381 c0_g1_i1 m.105457	--NA--	--NA--	--NA--	--NA--	ShK-like	5.20E-06
TR2381 c0_g1_i2 m.105481	--NA--	--NA--	--NA--	--NA--	ShK-like	5.20E-06
TR24643 c0_g2_i1 m.1220865	--NA--	--NA--	Serpin	1.40E-80	Serpin	2.00E-77
TR24643 c0_g2_i2 m.1220875	--NA--	--NA--	Serpin	4.80E-22	Serpin	1.80E-19
TR24680 c1_g1_i1 m.1228686	C-type lectin	8.20E-33	C-type lectin	7.40E-17	C-type lectin	7.20E-09
TR24680 c1_g1_i2 m.1228744	--NA--	--NA--	C-type lectin	4.60E-17	C-type lectin	4.70E-09
TR25122 c0_g1_i1 m.1239621	CAP	6.10E-23	CAP	7.30E-51	CAP	9.40E-38
TR25122 c0_g1_i2 m.1239635	--NA--	--NA--	CAP	3.00E-51	CAP	9.50E-38
TR25295 c2_g1_i2 m.1244176	Phospholipase-B 81	2.60E-66	--NA--	--NA--	--NA--	--NA--
TR25706 c0_g1_i1 m.1263836	--NA--	--NA--	Peptidase S1	6.00E-58	Peptidase S1	3.10E-50
TR25756 c5_g1_i1 m.1267976	Phospholipase B	4.80E-64	--NA--	--NA--	--NA--	--NA--
TR25843 c6_g1_i1 m.1283729	--NA--	--NA--	C-type lectin	5.60E-21	C-type lectin	3.70E-15
TR26439 c0_g1_i1 m.1300062	Acetylcholinesterase	4.80E-66	--NA--	--NA--	--NA--	--NA--
TR26569 c0_g1_i1 m.1306169	--NA--	--NA--	Serpin	2.20E-23	Serpin	1.40E-19
TR26569 c0_g1_i2 m.1306182	Serpin	4.20E-104	Serpin	1.60E-138	Serpin	2.70E-132
TR26594 c0_g1_i3 m.1308745	--NA--	--NA--	CAP	7.10E-61	CAP	2.20E-39
TR27908 c1_g1_i1 m.1355918	Reticulocalbin 2	3.80E-57	--NA--	--NA--	--NA--	--NA--
TR27912 c6_g1_i1 m.1356905	Acetylcholinesterase	1.60E-162	--NA--	--NA--	--NA--	--NA--
TR27938 c2_g1_i1 m.1362718	--NA--	--NA--	C-type lectin	1.60E-15	C-type lectin	5.80E-11
TR27938 c2_g2_i2 m.1362746	--NA--	--NA--	C-type lectin	1.00E-14	C-type lectin	3.80E-10
TR27938 c5_g1_i4 m.1362896	Acetylcholinesterase	3.00E-160	C-type lectin	1.20E-22	C-type lectin	1.20E-18
TR27938 c5_g1_i6 m.1362959	--NA--	--NA--	C-type lectin	1.90E-23	C-type lectin	1.20E-18
TR28989 c0_g2_i1 m.1389742	Peptidase S1	9.70E-17	Peptidase S1	3.50E-23	Peptidase S1	1.50E-19
TR29102 c0_g1_i1 m.1405147	Venom prothrombin activator pseudarain-C non-catalytic subunit	1.50E-16	--NA--	--NA--	--NA--	--NA--
TR29223 c0_g1_i1 m.1417344	--NA--	--NA--	Kunitz	2.90E-27	Kunitz	4.00E-22
TR29287 c0_g1_i1 m.1418270	--NA--	--NA--	C-type lectin	3.10E-29	C-type lectin	1.40E-22
TR29625 c0_g1_i1 m.1437990	Cysteine rich venom protein	4.70E-30	--NA--	--NA--	ShK-like	4.60E-07
TR29716 c0_g1_i1 m.1439650	--NA--	--NA--	Kazal	1.20E-19	Kazal	6.70E-14
TR29796 c0_g1_i2 m.1446767	Alpha-latrocrustotoxin-Lt1a	1.60E-17	--NA--	--NA--	--NA--	--NA--
TR29850 c0_g1_i1 m.1455388	Peptidase S1	1.30E-65	C-type lectin	2.80E-11	C-type lectin	2.90E-11
TR29884 c0_g1_i1 m.1458245	Peptidase S1	6.90E-17	Peptidase S1	4.90E-14	Peptidase S1	1.00E-09
TR30653 c0_g1_i1 m.1496787	--NA--	--NA--	C-type lectin	1.70E-22	C-type lectin	3.50E-16
TR30653 c0_g2_i1 m.1496809	--NA--	--NA--	C-type lectin	3.10E-16	C-type lectin	4.40E-11
TR30873 c0_g1_i1 m.1500073	--NA--	--NA--	C-type lectin	3.80E-28	C-type lectin	6.00E-22
TR30873 c0_g1_i2 m.1500089	C-type lectin BJcUL	9.10E-12	C-type lectin	3.70E-24	C-type lectin	3.60E-18
TR31549 c1_g1_i1 m.1509363	--NA--	--NA--	C-type lectin	1.10E-26	C-type lectin	3.50E-21
TR31549 c1_g1_i2 m.1509378	--NA--	--NA--	C-type lectin	1.70E-25	C-type lectin	2.90E-21
TR31549 c1_g1_i3 m.1509394	--NA--	--NA--	C-type lectin	1.10E-26	C-type lectin	3.60E-21
TR32250 c0_g1_i1 m.1523148	--NA--	--NA--	Kazal	3.40E-15	Kazal	2.50E-12
TR328 c1_g1_i1 m.13443	Serpin	4.10E-37	Serpin	4.10E-46	Serpin	1.80E-42
TR3357 c0_g1_i1 m.130794	--NA--	--NA--	C-type lectin	1.10E-28	C-type lectin	2.60E-17
TR33818 c0_g1_i2 m.1627990	--NA--	--NA--	Metalloproteinase M12	1.00E-15	--NA--	--NA--
TR34146 c0_g1_i1 m.1636137	Sphingomyelinase D	1.90E-88	Sphingomyelinase D	4.30E-22	--NA--	--NA--
TR34146 c0_g1_i2 m.1636171	Sphingomyelinase D	2.10E-89	Sphingomyelinase D	3.00E-22	--NA--	--NA--
TR34171 c0_g1_i1 m.1637146	--NA--	--NA--	Metalloproteinase M12	2.90E-16	Metalloproteinase M12	2.00E-15
TR35584 c0_g1_i1 m.1694540	--NA--	--NA--	Phospholipase A2	3.30E-18	Phospholipase A2	1.20E-21
TR36144 c2_g2_i1 m.1722495	--NA--	--NA--	--NA--	--NA--	Metalloproteinase M12	8.20E-15
TR36272 c0_g1_i1 m.1729272	--NA--	--NA--	Lipocalin	7.30E-27	Lipocalin	1.80E-19
TR36405 c0_g1_i1 m.1740141	Phospholipase D LspiSicTox-betaIII1	7.30E-65	--NA--	--NA--	--NA--	--NA--
TR36662 c1_g1_i1 m.1772343	Kazal	5.30E-93	Kazal	6.70E-32	Kazal	9.50E-13
TR36662 c1_g1_i2 m.1772383	Kazal	5.30E-93	Kazal	6.70E-32	Kazal	9.50E-13
TR36671 c7_g1_i11 m.1774664	Kazal	4.20E-50	Kazal	9.40E-13	Kazal	3.50E-10
TR36671 c7_g1_i13 m.1774771	Kazal	1.70E-50	Kazal	8.50E-13	Kazal	3.20E-10
TR36671 c7_g1_i14 m.1774827	--NA--	--NA--	Kazal	9.40E-13	Kazal	3.50E-10
TR36671 c7_g1_i19 m.1775064	--NA--	--NA--	Kazal	9.40E-13	Kazal	3.50E-10
TR36671 c7_g1_i24 m.1775344	Kazal	4.20E-50	Kazal	9.40E-13	Kazal	3.50E-10
TR36671 c7_g1_i6 m.1774441	Kazal	1.70E-50	Kazal	8.50E-13	Kazal	3.20E-10
TR38645 c0_g2_i2 m.1871689	--NA--	--NA--	Metalloproteinase M12	1.60E-06	--NA--	--NA--

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
TR39002 c4_g1_i2 m.1881498	Techylectin-like protein	2.00E-37	--NA--	--NA--	--NA--	--NA--
TR39609 c0_g1_i1 m.1902798	Chitinase	5.10E-135	Chitinase	9.10E-146	Chitinase	5.20E-135
TR40297 c9_g1_i1 m.1925547	--NA--	--NA--	Kazal	2.70E-09	Kazal	3.50E-07
TR40810 c0_g1_i1 m.1952088	--NA--	--NA--	Peptidase S1	9.00E-20	Peptidase S1	1.30E-15
TR41132 c0_g1_i1 m.1977684	--NA--	--NA--	Peptidase S1	2.70E-57	Peptidase S1	2.00E-48
TR41173 c0_g2_i1 m.1978687	--NA--	--NA--	C-type lectin	1.10E-19	C-type lectin	8.30E-13
TR41757 c0_g1_i1 m.1985738	Phospholipase D LhSicTox-alphaIA1ii	9.80E-47	--NA--	--NA--	--NA--	--NA--
TR42986 c0_g2_i1 m.2008866	Snaclec agglucetin subunit alpha-1	5.80E-13	C-type lectin	1.10E-20	C-type lectin	5.00E-16
TR43332 c0_g1_i1 m.2020967	Phospholipase A1	5.70E-34	--NA--	--NA--	--NA--	--NA--
TR43332 c1_g1_i1 m.2020986	Phospholipase D LhSicTox-alphaIA1ii	1.80E-44	--NA--	--NA--	--NA--	--NA--
TR43364 c1_g1_i1 m.2022301	C-type lectin	2.40E-50	C-type lectin	1.50E-19	C-type lectin	2.10E-15
TR43377 c0_g2_i1 m.2023182	Hyaluronidase	9.40E-96	Hyaluronidase	2.90E-135	Hyaluronidase	3.10E-125
TR43418 c0_g1_i1 m.2025569	--NA--	--NA--	Chitinase	1.50E-07	--NA--	--NA--
TR43418 c0_g1_i2 m.2025592	--NA--	--NA--	Chitinase	1.30E-07	--NA--	--NA--
TR44531 c0_g1_i1 m.2045772	Peptidase S10	1.10E-129	Peptidase S10	2.30E-92	Peptidase S10	4.40E-96
TR44583 c0_g1_i1 m.2048670	Acetylcholinesterase	8.10E-60	--NA--	--NA--	--NA--	--NA--
TR44758 c3_g1_i1 m.2067699	Kazal	6.70E-08	--NA--	--NA--	--NA--	--NA--
TR44785 c0_g2_i1 m.2072571	--NA--	--NA--	Serpin	4.70E-32	Serpin	5.50E-30
TR46127 c0_g1_i4 m.2148338	--NA--	--NA--	C-type lectin	3.70E-36	C-type lectin	7.40E-28
TR465 c1_g2_i1 m.31605	--NA--	--NA--	C-type lectin	7.10E-28	C-type lectin	9.20E-24
TR46721 c0_g1_i1 m.2170048	--NA--	--NA--	Chitinase	8.20E-07	Chitinase	1.80E-07
TR46976 c0_g2_i1 m.2182814	Peptidase S10	5.70E-77	Peptidase S10	1.90E-45	Peptidase S10	1.20E-45
TR47055 c2_g1_i2 m.2191371	--NA--	--NA--	C-type lectin	7.00E-30	C-type lectin	2.10E-22
TR475 c2_g1_i4 m.33888	Chitinase	5.70E-64	--NA--	--NA--	--NA--	--NA--
TR48565 c1_g2_i3 m.2283936	--NA--	--NA--	Metalloproteinase M12	1.60E-10	--NA--	--NA--
TR48565 c1_g2_i4 m.2283966	Metalloproteinase M12	1.60E-87	Metalloproteinase M12	5.60E-50	Metalloproteinase M12	1.50E-19
TR48565 c1_g2_i5 m.2283997	Metalloproteinase M12	6.20E-88	Metalloproteinase M12	3.50E-50	Metalloproteinase M12	1.10E-19
TR48588 c4_g1_i1 m.2289142	--NA--	--NA--	C-type lectin	8.30E-20	C-type lectin	1.30E-11
TR48588 c6_g1_i1 m.2289205	--NA--	--NA--	C-type lectin	4.80E-30	C-type lectin	3.80E-21
TR48588 c6_g2_i1 m.2289228	--NA--	--NA--	C-type lectin	4.80E-30	C-type lectin	3.80E-21
TR4916 c4_g1_i1 m.204482	--NA--	--NA--	Peptidase S1	5.00E-58	Peptidase S1	1.50E-50
TR4916 c4_g1_i2 m.204519	--NA--	--NA--	Peptidase S1	5.00E-58	Peptidase S1	1.50E-50
TR49346 c2_g1_i3 m.2356763	--NA--	--NA--	Sphingomyelinase D	4.40E-36	--NA--	--NA--
TR49562 c0_g1_i1 m.2373259	Kunitz-type serine protease inhibitor	1.50E-26	Kunitz	1.40E-23	Kunitz	8.00E-23
TR49563 c0_g1_i1 m.2373269	C-type lectin	1.40E-12	C-type lectin	2.00E-27	C-type lectin	1.40E-22
TR49788 c0_g1_i1 m.2385282	--NA--	--NA--	C-type lectin	2.10E-33	C-type lectin	8.20E-27
TR49818 c0_g1_i2 m.2386513	--NA--	--NA--	CAP	5.90E-45	CAP	2.50E-31
TR51106 c0_g1_i2 m.2438358	Peptidase S10	8.50E-144	--NA--	--NA--	--NA--	--NA--
TR52200 c3_g1_i5 m.2474883	Techylectin-like protein	3.90E-67	--NA--	--NA--	--NA--	--NA--
TR52200 c3_g1_i6 m.2474904	Techylectin-like protein	2.90E-67	--NA--	--NA--	--NA--	--NA--
TR52637 c0_g1_i2 m.2499074	--NA--	--NA--	C-type lectin	2.50E-14	C-type lectin	1.40E-09
TR5267 c0_g1_i1 m.212573	Snake venom serine protease NaSP	6.00E-116	Peptidase S1	1.90E-80	Peptidase S1	1.20E-73
TR53597 c0_g1_i1 m.2556686	Endothelial lipase	5.40E-40	--NA--	--NA--	--NA--	--NA--
TR53810 c0_g1_i1 m.2565407	--NA--	--NA--	--NA--	--NA--	ShK-like	5.00E-08
TR53810 c0_g1_i2 m.2565427	--NA--	--NA--	--NA--	--NA--	ShK-like	1.20E-07
TR5432 c7_g1_i2 m.222029	--NA--	--NA--	Chitinase	3.20E-27	Chitinase	7.10E-28
TR5432 c7_g1_i3 m.222054	--NA--	--NA--	Chitinase	3.20E-27	Chitinase	1.30E-27
TR5432 c7_g1_i6 m.222100	--NA--	--NA--	Chitinase	2.80E-27	Chitinase	3.20E-27
TR5432 c7_g1_i8 m.222126	--NA--	--NA--	Chitinase	6.60E-27	Chitinase	6.40E-27
TR54877 c0_g1_i1 m.2637871	Peptidase S1	1.20E-23	Peptidase S1	1.50E-38	Peptidase S1	8.40E-34
TR55130 c5_g3_i1 m.2647569	--NA--	--NA--	C-type lectin	3.40E-44	C-type lectin	1.20E-34
TR55130 c5_g3_i2 m.2647602	--NA--	--NA--	C-type lectin	3.40E-44	C-type lectin	1.20E-34
TR56994 c1_g3_i2 m.2721900	--NA--	--NA--	Kunitz	5.20E-24	Kunitz	1.20E-20
TR56994 c1_g3_i5 m.2721967	--NA--	--NA--	Kunitz	3.20E-25	Kunitz	5.90E-21
TR57728 c0_g1_i1 m.2756910	--NA--	--NA--	CAP	4.30E-60	CAP	2.90E-41
TR58081 c0_g1_i1 m.2800655	Zinc metalloproteinase/disintegrin-like HR1a	1.20E-82	Metalloproteinase M12	4.50E-109	Metalloproteinase M12	9.60E-30
TR59134 c0_g1_i1 m.2837689	Acetylcholinesterase	2.60E-59	--NA--	--NA--	--NA--	--NA--
TR59134 c0_g1_i2 m.2837728	Acetylcholinesterase	3.10E-60	--NA--	--NA--	--NA--	--NA--
TR59337 c0_g1_i1 m.2856360	ArgT64	6.50E-18	--NA--	--NA--	--NA--	--NA--
TR60208 c0_g1_i1 m.2899567	--NA--	--NA--	C-type lectin	2.50E-27	C-type lectin	2.30E-24
TR60426 c0_g2_i1 m.2902658	--NA--	--NA--	Peptidase S1	2.50E-59	Peptidase S1	1.90E-52
TR60543 c1_g1_i1 m.2906156	Kazal	7.00E-84	Kazal	1.90E-17	--NA--	--NA--
TR60716 c0_g1_i1 m.2909880	Cysteine rich venom peptide	1.20E-34	C-type lectin	8.60E-28	C-type lectin	3.30E-19
TR60730 c0_g1_i1 m.2909979	--NA--	--NA--	C-type lectin	4.60E-31	C-type lectin	1.20E-22
TR61243 c1_g2_i1 m.2917285	CAP	5.50E-22	CAP	1.40E-34	CAP	8.00E-27
TR61716 c0_g1_i1 m.2928352	--NA--	--NA--	C-type lectin	5.70E-35	C-type lectin	1.80E-29
TR62743 c0_g1_i2 m.2979791	C-type lectin	1.90E-51	--NA--	--NA--	--NA--	--NA--
TR62975 c0_g1_i1 m.2991792	--NA--	--NA--	Peptidase S1	2.50E-57	Peptidase S1	9.00E-50
TR62975 c0_g2_i1 m.2991810	--NA--	--NA--	Peptidase S1	4.30E-55	Peptidase S1	3.00E-49

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
TR63143 c3_g1_i1 m.3010249	Cytolysin SmT-1	8.80E-43	--NA--	--NA--	--NA--	--NA--
TR63164 c2_g1_i1 m.3013742	--NA--	--NA--	CAP	7.20E-30	CAP	3.30E-22
TR63164 c2_g1_i2 m.3013759	--NA--	--NA--	CAP	3.10E-30	CAP	3.00E-22
TR6366 c0_g1_i1 m.258028	Acetylcholinesterase	3.20E-64	--NA--	--NA--	--NA--	--NA--
TR6366 c0_g1_i2 m.258061	Venom carboxylesterase-6	3.00E-57	--NA--	--NA--	--NA--	--NA--
TR64259 c1_g1_i1 m.3051363	--NA--	--NA--	C-type lectin	2.30E-19	C-type lectin	5.40E-15
TR64259 c1_g1_i2 m.3051378	C-type lectin	1.70E-18	C-type lectin	2.30E-19	C-type lectin	5.40E-15
TR65113 c0_g1_i4 m.3078605	Phospholipase D LruSicTox-alphaC2	4.10E-45	--NA--	--NA--	--NA--	--NA--
TR65449 c0_g1_i1 m.3084034	Metalloproteinase M12	5.80E-45	Metalloproteinase M12	2.50E-10	Metalloproteinase M12	1.30E-25
TR65679 c3_g1_i2 m.3103227	--NA--	--NA--	C-type lectin	1.20E-07	--NA--	--NA--
TR65774 c0_g1_i1 m.3107475	Techylectin-like protein	3.00E-32	--NA--	--NA--	--NA--	--NA--
TR6708 c0_g1_i1 m.293311	C-type lectin TsL	3.50E-13	C-type lectin	1.30E-31	C-type lectin	3.00E-25
TR67155 c5_g1_i10 m.3156029	Metalloproteinase M12	9.80E-104	Metalloproteinase M12	4.10E-25	Metalloproteinase M12	2.90E-23
TR67155 c5_g1_i4 m.3155706	Metalloproteinase M12	9.80E-104	Metalloproteinase M12	4.10E-25	Metalloproteinase M12	2.90E-23
TR67155 c5_g1_i6 m.3155821	Metalloproteinase M12	9.80E-104	Metalloproteinase M12	4.10E-25	Metalloproteinase M12	2.90E-23
TR67155 c5_g1_i9 m.3155959	Metalloproteinase M12	9.80E-104	Metalloproteinase M12	4.10E-25	Metalloproteinase M12	2.90E-23
TR6720 c6_g3_i4 m.294836	--NA--	--NA--	Lipocalin	8.20E-21	Lipocalin	5.90E-13
TR67249 c0_g1_i1 m.3167244	Techylectin-like protein	5.30E-46	--NA--	--NA--	--NA--	--NA--
TR67303 c1_g2_i1 m.3170472	--NA--	--NA--	Agatoxin	6.50E-06	--NA--	--NA--
TR68803 c0_g1_i1 m.3213065	Endothelial lipase	1.70E-42	--NA--	--NA--	--NA--	--NA--
TR68803 c0_g1_i2 m.3213078	Endothelial lipase	6.30E-63	--NA--	--NA--	--NA--	--NA--
TR69614 c0_g1_i1 m.3227854	Peptidase S1	8.80E-46	Peptidase S1	2.00E-61	Peptidase S1	1.10E-53
TR69974 c1_g1_i1 m.3233984	Chitinase	7.30E-78	Chitinase	9.40E-67	Chitinase	1.10E-60
TR72133 c0_g1_i1 m.3303494	--NA--	--NA--	Metalloproteinase M12	6.40E-24	Metalloproteinase M12	9.80E-23
TR72133 c0_g1_i2 m.3303523	--NA--	--NA--	Metalloproteinase M12	7.20E-25	Metalloproteinase M12	1.40E-23
TR72349 c1_g1_i1 m.3327515	--NA--	--NA--	C-type lectin	3.10E-26	C-type lectin	4.20E-20
TR72349 c1_g1_i2 m.3327572	--NA--	--NA--	C-type lectin	3.10E-26	C-type lectin	4.20E-20
TR72441 c3_g1_i4 m.3338298	--NA--	--NA--	--NA--	--NA--	CAP	1.00E-06
TR72441 c3_g1_i7 m.3338348	--NA--	--NA--	--NA--	--NA--	CAP	3.00E-08
TR72604 c2_g1_i1 m.3351314	--NA--	--NA--	C-type lectin	3.80E-12	C-type lectin	3.00E-10
TR72662 c0_g1_i1 m.3358233	--NA--	--NA--	Peptidase S1	2.30E-58	Peptidase S1	1.40E-50
TR72666 c5_g1_i1 m.3358513	Peptidase S10	5.10E-63	--NA--	--NA--	--NA--	--NA--
TR728 c1_g1_i1 m.40884	--NA--	--NA--	Kazal	1.40E-09	Kazal	6.70E-08
TR728 c1_g1_i2 m.40905	--NA--	--NA--	Kazal	2.70E-09	Kazal	1.10E-07
TR728 c1_g1_i3 m.40933	Kazal	2.60E-30	Kazal	5.60E-09	Kazal	7.60E-08
TR728 c1_g1_i4 m.40955	--NA--	--NA--	Kazal	1.80E-09	Kazal	9.30E-08
TR728 c1_g1_i5 m.40980	Kazal	1.40E-27	Kazal	1.40E-09	Kazal	5.10E-08
TR7315 c2_g1_i1 m.318839	--NA--	--NA--	Peptidase S1	6.70E-56	Peptidase S1	2.40E-49
TR7328 c0_g1_i1 m.319436	--NA--	--NA--	C-type lectin	5.40E-34	C-type lectin	1.40E-25
TR7328 c0_g1_i2 m.319466	--NA--	--NA--	C-type lectin	5.40E-34	C-type lectin	1.40E-25
TR73487 c0_g1_i1 m.3383832	--NA--	--NA--	C-type lectin	8.20E-22	C-type lectin	1.10E-19
TR74166 c0_g1_i1 m.3404208	Kappa-actitoxin-Bcs3a	2.90E-30	--NA--	--NA--	ShK-like	2.20E-08
TR74207 c2_g1_i3 m.3409692	--NA--	--NA--	C-type lectin	1.40E-32	C-type lectin	8.70E-25
TR74871 c4_g3_i1 m.3451018	Hyaluronidase	1.20E-88	--NA--	--NA--	--NA--	--NA--
TR74920 c1_g1_i1 m.3458278	Metalloproteinase M12	2.10E-58	Metalloproteinase M12	8.10E-14	Metalloproteinase M12	9.90E-14
TR74920 c1_g1_i2 m.3458317	Metalloproteinase M12	2.10E-58	Metalloproteinase M12	8.10E-14	Metalloproteinase M12	9.90E-14
TR75256 c0_g6_i1 m.3483387	Peptidase S1	1.20E-62	C-type lectin	2.80E-22	C-type lectin	1.00E-17
TR75256 c0_g6_i1 m.3483387	Peptidase S1	1.20E-62	C-type lectin	2.80E-22	Peptidase S1	1.40E-65
TR75256 c0_g6_i1 m.3483387	Peptidase S1	1.20E-62	Peptidase S1	8.80E-77	C-type lectin	1.00E-17
TR75256 c0_g6_i1 m.3483387	Peptidase S1	1.20E-62	Peptidase S1	8.80E-77	Peptidase S1	1.40E-65
TR7539 c0_g1_i1 m.322713	Lysosomal acid lipase/cholesteryl ester hydrolase	3.50E-115	--NA--	--NA--	--NA--	--NA--
TR75565 c1_g2_i1 m.3524518	--NA--	--NA--	Peptidase S1	1.70E-28	Peptidase S1	1.20E-23
TR75565 c1_g2_i2 m.3524527	Peptidase S1	1.30E-84	Peptidase S1	1.90E-54	Peptidase S1	4.50E-47
TR76072 c1_g1_i1 m.3538601	Kunitz-type serine protease inhibitor	1.20E-24	Kunitz	7.60E-30	Kunitz	6.20E-25
TR76519 c0_g1_i1 m.3550240	--NA--	--NA--	C-type lectin	5.40E-27	C-type lectin	1.20E-20
TR76665 c0_g1_i1 m.3560023	--NA--	--NA--	Cystatin	1.70E-24	Cystatin	2.50E-21
TR77069 c0_g1_i1 m.3577023	C-type lectin	3.00E-13	C-type lectin	7.00E-26	C-type lectin	1.90E-22
TR77261 c0_g1_i1 m.3580140	--NA--	--NA--	--NA--	--NA--	ShK-like	1.10E-06
TR78075 c0_g1_i1 m.3633750	Serpin	1.80E-88	Serpin	1.10E-124	Serpin	5.10E-118
TR78686 c0_g1_i1 m.3643420	--NA--	--NA--	Sphingomyelinase D	1.70E-25	--NA--	--NA--
TR78730 c0_g1_i2 m.3648775	--NA--	--NA--	C-type lectin	2.60E-23	C-type lectin	1.30E-16
TR7963 c1_g2_i1 m.334852	Zinc metalloproteinase dpy-31	1.70E-76	--NA--	--NA--	--NA--	--NA--
TR796 c1_g1_i2 m.42663	Venom phosphodiesterase 2	4.10E-53	--NA--	--NA--	--NA--	--NA--
TR81994 c0_g1_i1 m.3682076	Zinc metalloproteinase dpy-31	1.70E-76	Peptidase S1	7.20E-57	Peptidase S1	2.90E-50
TR82641 c0_g1_i1 m.3688181	--NA--	--NA--	Peptidase S1	1.50E-44	Peptidase S1	6.40E-39
TR82641 c0_g2_i1 m.3688195	--NA--	--NA--	Peptidase S1	6.50E-45	Peptidase S1	2.70E-39
TR82641 c0_g3_i1 m.3688209	Peptidase S1	4.10E-40	Peptidase S1	9.80E-56	Peptidase S1	1.20E-48
TR8480 c0_g1_i1 m.371205	--NA--	--NA--	Phospholipase A2	6.70E-36	Phospholipase A2	4.30E-24
TR86620 c1_g1_i1 m.3723037	Peptidase S1	1.50E-15	Peptidase S1	3.50E-20	Peptidase S1	5.30E-17

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
TR8969 c4_g2_i3 m.414874	C-type lectin	2.30E-13	C-type lectin	7.10E-19	C-type lectin	6.20E-13
TR929 c0_g1_i1 m.50412	Techylectin-like protein	3.10E-37	--NA--	--NA--	--NA--	--NA--
TR94568 c0_g1_i1 m.3794445	--NA--	--NA--	Cystatin	5.10E-29	Cystatin	1.60E-21
TR94568 c0_g3_i1 m.3794458	Cystatin-POGU1	1.20E-37	Cystatin	1.10E-26	Cystatin	1.40E-21
TR94865 c0_g1_i1 m.3797109	Techylectin-like protein	7.60E-60	--NA--	--NA--	--NA--	--NA--
TR94865 c0_g2_i1 m.3797119	Techylectin-like protein	2.70E-59	--NA--	--NA--	--NA--	--NA--
TR9595 c4_g2_i7 m.452082	Delta-hexatoxin-Mg1a	1.30E-17	--NA--	--NA--	--NA--	--NA--

Supplementary Material online

Are fireworms venomous? Evidence for the convergent evolution of toxin homologs in three species of fireworms (Annelida, Amphinomidae).

Aida Verdes, Danny Simpson and Mandē Holford

Supplementary Material includes:

Supplementary file S1: supplementary tables S1–S3, supplementary figures S1–S7.

Supplementary file S2: toxin homologs identified in *Eurythoe complanata*.

Supplementary file S3: toxin homologs identified in *Hermodice carunculata*.

Supplementary file S4: toxin homologs identified in *Paramphinoe jeffreysii*.

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
paramphinoe_s7_sc33_trim_unpaired_contig_10130 m.122853	--NA--	--NA--	--NA--	--NA--	ShK-like	6.60E-06
paramphinoe_s7_sc33_trim_unpaired_contig_10167 m.123289	--NA--	--NA--	Hainantoxin	2.50E-10	Hainantoxin	2.60E-08
paramphinoe_s7_sc33_trim_unpaired_contig_10167 m.123289	--NA--	--NA--	Hainantoxin	2.50E-10	Hainantoxin	3.70E-06
paramphinoe_s7_sc33_trim_unpaired_contig_10167 m.123289	--NA--	--NA--	Omega conotoxin	7.10E-06	Omega conotoxin	2.60E-08
paramphinoe_s7_sc33_trim_unpaired_contig_10167 m.123289	--NA--	--NA--	Omega conotoxin	7.10E-06	Omega conotoxin	3.70E-06
paramphinoe_s7_sc33_trim_unpaired_contig_10442 m.126377	Cystatin	6.90E-21	--NA--	--NA--	Cystatin	4.70E-23
paramphinoe_s7_sc33_trim_unpaired_contig_10442 m.126377	Cystatin	6.90E-21	Cystatin	3.40E-27	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_1061 m.13144	--NA--	--NA--	Peptidase S1	4.40E-33	Peptidase S1	1.60E-28
paramphinoe_s7_sc33_trim_unpaired_contig_1062 m.13156	--NA--	--NA--	Peptidase S1	2.50E-33	Peptidase S1	1.30E-28
paramphinoe_s7_sc33_trim_unpaired_contig_10767 m.129765	--NA--	--NA--	Peptidase S1	3.40E-20	Peptidase S1	8.10E-16
paramphinoe_s7_sc33_trim_unpaired_contig_11066 m.133294	Alpha-conotoxin VxXXA	1.60E-09	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_11134 m.134173	Chitinase	8.90E-24	Chitinase	8.00E-21	Chitinase	3.90E-18
paramphinoe_s7_sc33_trim_unpaired_contig_11231 m.135205	--NA--	--NA--	Peptidase S10	1.60E-101	Peptidase S10	5.80E-104
paramphinoe_s7_sc33_trim_unpaired_contig_1130 m.14022	Techylectin-like protein	6.80E-40	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_11329 m.136281	Peptidase S10	4.10E-37	Peptidase S10	6.00E-22	Peptidase S10	4.40E-22
paramphinoe_s7_sc33_trim_unpaired_contig_11330 m.136290	Peptidase S10	1.40E-36	Peptidase S10	1.10E-21	Peptidase S10	8.50E-22
paramphinoe_s7_sc33_trim_unpaired_contig_11837 m.142090	--NA--	--NA--	Metalloproteinase M12	3.10E-09	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_1191 m.14744	Techylectin-like protein	3.50E-44	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_12285 m.146848	--NA--	--NA--	C-type lectin	1.80E-13	C-type lectin	3.00E-09
paramphinoe_s7_sc33_trim_unpaired_contig_12541 m.15241	C-type lectin	9.60E-12	C-type lectin	3.00E-17	C-type lectin	4.60E-12
paramphinoe_s7_sc33_trim_unpaired_contig_12468 m.148825	Techylectin-like protein	2.60E-47	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_124 m.1575	--NA--	--NA--	CAP	5.80E-10	CAP	4.80E-06
paramphinoe_s7_sc33_trim_unpaired_contig_12950 m.151252	--NA--	--NA--	C-type lectin	1.80E-25	C-type lectin	1.10E-19
paramphinoe_s7_sc33_trim_unpaired_contig_12839 m.152836	Sphingomyelinase	3.60E-98	Sphingomyelinase D	8.90E-36	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_12901 m.153493	--NA--	--NA--	Peptidase S1	9.90E-38	Peptidase S1	3.60E-32
paramphinoe_s7_sc33_trim_unpaired_contig_12950 m.153935	--NA--	--NA--	C-type lectin	7.10E-08	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_13741 m.162530	C-type lectin	6.40E-47	C-type lectin	1.30E-18	C-type lectin	2.00E-14
paramphinoe_s7_sc33_trim_unpaired_contig_1396 m.17245	Techylectin-like protein	8.30E-50	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_1428 m.17668	--NA--	--NA--	Chitinase	1.00E-05	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_144 m.1826	--NA--	--NA--	Metalloproteinase M12	9.00E-16	Metalloproteinase M12	3.80E-14
paramphinoe_s7_sc33_trim_unpaired_contig_14584 m.171196	--NA--	--NA--	--NA--	--NA--	ShK-like	1.90E-06
paramphinoe_s7_sc33_trim_unpaired_contig_14755 m.172921	Mannose-binding lectin	1.00E-63	C-type lectin	9.10E-10	C-type lectin	2.40E-10
paramphinoe_s7_sc33_trim_unpaired_contig_14766 m.173102	--NA--	--NA--	C-type lectin	2.60E-09	C-type lectin	1.00E-07
paramphinoe_s7_sc33_trim_unpaired_contig_15052 m.176255	Cysteine-rich venom protein pseudocin	1.70E-22	CAP	5.60E-46	CAP	4.30E-33
paramphinoe_s7_sc33_trim_unpaired_contig_15193 m.177685	--NA--	--NA--	Peptidase S1	2.70E-30	Peptidase S1	6.90E-27
paramphinoe_s7_sc33_trim_unpaired_contig_1546 m.19245	Gigantoxin	3.80E-12	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_15649 m.182402	--NA--	--NA--	Peptidase S1	9.60E-09	Peptidase S1	3.30E-06
paramphinoe_s7_sc33_trim_unpaired_contig_15828 m.184147	--NA--	--NA--	Kunitz	5.90E-29	Kunitz	4.10E-22
paramphinoe_s7_sc33_trim_unpaired_contig_15848 m.184330	Acetylcholinesterase	1.20E-61	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_16921 m.195233	--NA--	--NA--	C-type lectin	5.20E-23	C-type lectin	9.70E-20
paramphinoe_s7_sc33_trim_unpaired_contig_17038 m.196493	--NA--	--NA--	C-type lectin	2.30E-21	C-type lectin	7.90E-17
paramphinoe_s7_sc33_trim_unpaired_contig_181 m.2308	Techylectin-like protein	3.70E-40	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_18305 m.208724	--NA--	--NA--	Serpin	3.60E-31	Serpin	1.90E-28
paramphinoe_s7_sc33_trim_unpaired_contig_187 m.2381	--NA--	--NA--	--NA--	--NA--	C-type lectin	6.80E-17
paramphinoe_s7_sc33_trim_unpaired_contig_18848 m.214234	--NA--	--NA--	Sphingomyelinase D	7.20E-21	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_19327 m.218971	Alpha-latrotoxin associated low molecular weight protein	1.20E-11	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_19609 m.221806	Metalloproteinase	2.50E-46	C-type lectin	9.50E-16	C-type lectin	8.30E-09
paramphinoe_s7_sc33_trim_unpaired_contig_19609 m.221806	Metalloproteinase	2.50E-46	C-type lectin	9.50E-16	Metalloproteinase M12	1.30E-22
paramphinoe_s7_sc33_trim_unpaired_contig_19609 m.221806	Metalloproteinase	2.50E-46	Metalloproteinase M12	6.70E-25	C-type lectin	8.30E-09
paramphinoe_s7_sc33_trim_unpaired_contig_19609 m.221806	Metalloproteinase	2.50E-46	Metalloproteinase M12	6.70E-25	Metalloproteinase M12	1.30E-22
paramphinoe_s7_sc33_trim_unpaired_contig_19793 m.223547	--NA--	--NA--	C-type lectin	4.80E-24	C-type lectin	5.40E-17
paramphinoe_s7_sc33_trim_unpaired_contig_1994 m.24728	--NA--	--NA--	Metalloproteinase M12	1.80E-18	Metalloproteinase M12	6.20E-18
paramphinoe_s7_sc33_trim_unpaired_contig_20097 m.226519	ShK-like	3.50E-10	--NA--	--NA--	ShK-like	6.90E-07
paramphinoe_s7_sc33_trim_unpaired_contig_201 m.2563	Techylectin-like protein	2.90E-54	--NA--	--NA--	--NA--	--NA--
paramphinoe_s7_sc33_trim_unpaired_contig_20513 m.230407	--NA--	--NA--	Metalloproteinase M12	2.10E-26	Metalloproteinase M12	1.70E-12
paramphinoe_s7_sc33_trim_unpaired_contig_21081 m.235808	Metalloproteinase	1.40E-59	Metalloproteinase M12	5.70E-19	Metalloproteinase M12	3.30E-17
paramphinoe_s7_sc33_trim_unpaired_contig_21217 m.237135	--NA--	--NA--	C-type lectin	6.70E-25	C-type lectin	8.20E-19

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
paramphinome_s7_sc33_trim_unpaired_contig_21435 m.239215	Peptidase S1	1.30E-82	Peptidase S1	5.10E-44	Peptidase S1	1.00E-37
paramphinome_s7_sc33_trim_unpaired_contig_21915 m.243579	--NA--	--NA--	C-type lectin	2.60E-19	C-type lectin	2.00E-18
paramphinome_s7_sc33_trim_unpaired_contig_21934 m.243800	--NA--	--NA--	C-type lectin	6.70E-12	C-type lectin	4.10E-07
paramphinome_s7_sc33_trim_unpaired_contig_2216 m.27528	Techylectin-like protein	5.50E-35	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_22265 m.246796	--NA--	--NA--	Peptidase S1	5.00E-17	Peptidase S1	1.30E-12
paramphinome_s7_sc33_trim_unpaired_contig_2246 m.27953	Venom carboxylesterase-6	5.60E-19	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_227 m.2968	--NA--	--NA--	CAP	3.50E-45	CAP	2.00E-29
paramphinome_s7_sc33_trim_unpaired_contig_23078 m.254130	Cysteine-rich venom protein latiseimin	3.60E-26	CAP	1.80E-44	CAP	4.00E-32
paramphinome_s7_sc33_trim_unpaired_contig_23441 m.257618	--NA--	--NA--	C-type lectin	1.10E-26	C-type lectin	1.80E-18
paramphinome_s7_sc33_trim_unpaired_contig_23629 m.259317	Metalloendopeptidase	8.30E-48	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_24054 m.263218	Venom phosphodiesterase 1	9.00E-14	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_24753 m.269344	--NA--	--NA--	C-type lectin	2.50E-21	C-type lectin	6.30E-16
paramphinome_s7_sc33_trim_unpaired_contig_2608 m.32580	Serpin	3.50E-81	Serpin	1.40E-131	Serpin	1.40E-125
paramphinome_s7_sc33_trim_unpaired_contig_2620 m.32781	Serpin	5.00E-81	Serpin	6.50E-134	Serpin	2.10E-127
paramphinome_s7_sc33_trim_unpaired_contig_26272 m.282522	--NA--	--NA--	Peptidase S1	3.80E-21	Peptidase S1	3.20E-18
paramphinome_s7_sc33_trim_unpaired_contig_26294 m.282718	--NA--	--NA--	C-type lectin	1.00E-16	C-type lectin	4.30E-12
paramphinome_s7_sc33_trim_unpaired_contig_26201 m.32910	Metalloproteinase	6.50E-34	Metalloproteinase M12	5.00E-18	Metalloproteinase M12	9.20E-18
paramphinome_s7_sc33_trim_unpaired_contig_26824 m.287357	Metalloproteinase	3.80E-59	Metalloproteinase M12	8.80E-21	Metalloproteinase M12	3.70E-18
paramphinome_s7_sc33_trim_unpaired_contig_28288 m.299806	--NA--	--NA--	C-type lectin	5.10E-25	C-type lectin	3.10E-19
paramphinome_s7_sc33_trim_unpaired_contig_2924 m.36554	Peptidase S10	1.50E-98	Peptidase S10	2.70E-60	Peptidase S10	7.00E-63
paramphinome_s7_sc33_trim_unpaired_contig_30574 m.318838	--NA--	--NA--	Serpin	6.00E-22	Serpin	4.90E-20
paramphinome_s7_sc33_trim_unpaired_contig_30740 m.320188	--NA--	--NA--	C-type lectin	8.10E-13	C-type lectin	2.50E-07
paramphinome_s7_sc33_trim_unpaired_contig_30869 m.321275	--NA--	--NA--	Peptidase S1	4.90E-16	Peptidase S1	7.30E-13
paramphinome_s7_sc33_trim_unpaired_contig_3169 m.39708	Metalloproteinase	5.20E-54	Metalloproteinase M12	2.90E-18	Metalloproteinase M12	1.60E-15
paramphinome_s7_sc33_trim_unpaired_contig_31723 m.328176	--NA--	--NA--	C-type lectin	4.80E-11	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_32166 m.331825	Snake venom 5'-nucleotidase	7.90E-148	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_32248 m.332548	Techylectin-like protein	4.00E-13	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_32513 m.334612	--NA--	--NA--	Peptidase S10	4.90E-08	Peptidase S10	5.80E-08
paramphinome_s7_sc33_trim_unpaired_contig_33507 m.342566	--NA--	--NA--	C-type lectin	3.60E-17	C-type lectin	5.50E-14
paramphinome_s7_sc33_trim_unpaired_contig_33522 m.342725	Chitinase	3.30E-38	Chitinase	5.30E-35	Chitinase	2.50E-32
paramphinome_s7_sc33_trim_unpaired_contig_3354 m.42134	--NA--	--NA--	--NA--	--NA--	ShK-like	2.50E-07
paramphinome_s7_sc33_trim_unpaired_contig_33593 m.343253	--NA--	--NA--	--NA--	--NA--	Lipocalin	7.90E-08
paramphinome_s7_sc33_trim_unpaired_contig_3390 m.42514	--NA--	--NA--	Phospholipase A2	4.70E-17	Phospholipase A2	1.60E-19
paramphinome_s7_sc33_trim_unpaired_contig_33 m.362	Peptidase S1	3.10E-37	Peptidase S1	3.80E-56	Peptidase S1	3.40E-49
paramphinome_s7_sc33_trim_unpaired_contig_341 m.4314	Gigantoxin	1.20E-22	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_34413 m.349836	--NA--	--NA--	Peptidase S1	2.70E-10	Peptidase S1	3.00E-07
paramphinome_s7_sc33_trim_unpaired_contig_3583 m.44796	--NA--	--NA--	C-type lectin	2.10E-21	C-type lectin	4.60E-19
paramphinome_s7_sc33_trim_unpaired_contig_35906 m.361825	--NA--	--NA--	C-type lectin	1.00E-14	C-type lectin	6.50E-10
paramphinome_s7_sc33_trim_unpaired_contig_36220 m.364320	C-type lectin	5.50E-42	C-type lectin	1.20E-22	C-type lectin	2.00E-17
paramphinome_s7_sc33_trim_unpaired_contig_36951 m.369888	Putative endothelial lipase	4.00E-27	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_3706 m.46348	Peptidase S1	1.20E-25	Peptidase S1	5.70E-45	Peptidase S1	3.40E-38
paramphinome_s7_sc33_trim_unpaired_contig_38020 m.378214	--NA--	--NA--	C-type lectin	3.10E-18	C-type lectin	5.90E-14
paramphinome_s7_sc33_trim_unpaired_contig_38637 m.382876	--NA--	--NA--	Kunitz	3.20E-25	Kunitz	5.30E-23
paramphinome_s7_sc33_trim_unpaired_contig_3883 m.48702	Metalloproteinase	8.80E-50	Metalloproteinase M12	3.60E-21	Metalloproteinase M12	5.10E-18
paramphinome_s7_sc33_trim_unpaired_contig_39429 m.388928	--NA--	--NA--	C-type lectin	5.60E-14	C-type lectin	2.00E-13
paramphinome_s7_sc33_trim_unpaired_contig_3971 m.49805	Techylectin-like protein	1.60E-15	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_4015 m.50297	--NA--	--NA--	C-type lectin	7.40E-21	C-type lectin	5.50E-14
paramphinome_s7_sc33_trim_unpaired_contig_40496 m.396785	CAP	3.60E-25	CAP	3.00E-40	CAP	1.00E-29
paramphinome_s7_sc33_trim_unpaired_contig_41270 m.402525	--NA--	--NA--	C-type lectin	4.40E-07	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_4365 m.54858	Techylectin-like protein	1.60E-26	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_44409 m.425511	--NA--	--NA--	C-type lectin	1.00E-18	C-type lectin	1.90E-12
paramphinome_s7_sc33_trim_unpaired_contig_4618 m.57953	--NA--	--NA--	C-type lectin	5.60E-26	C-type lectin	5.40E-18
paramphinome_s7_sc33_trim_unpaired_contig_48113 m.452014	--NA--	--NA--	C-type lectin	1.10E-07	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_48644 m.455768	--NA--	--NA--	Peptidase S1	7.00E-23	Peptidase S1	3.50E-19
paramphinome_s7_sc33_trim_unpaired_contig_48673 m.455947	CAP	8.50E-09	CAP	1.30E-16	CAP	1.10E-13
paramphinome_s7_sc33_trim_unpaired_contig_4877 m.61219	Metalloproteinase	8.80E-34	Metalloproteinase M12	1.70E-22	Metalloproteinase M12	1.10E-08
paramphinome_s7_sc33_trim_unpaired_contig_4897 m.61395	Techylectin-like protein	1.00E-50	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_4911 m.61579	--NA--	--NA--	Chitinase	4.30E-21	Chitinase	1.20E-18
paramphinome_s7_sc33_trim_unpaired_contig_50104 m.465998	--NA--	--NA--	C-type lectin	1.10E-16	C-type lectin	9.10E-12
paramphinome_s7_sc33_trim_unpaired_contig_5040 m.63173	--NA--	--NA--	Agatoxin	9.30E-09	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_51023 m.472466	--NA--	--NA--	C-type lectin	8.60E-06	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_51388 m.475048	Basic phospholipase A2 notechis 11'2	1.10E-16	Phospholipase A2	2.30E-11	Phospholipase A2	6.30E-13
paramphinome_s7_sc33_trim_unpaired_contig_5169 m.64679	Techylectin-like protein	1.00E-57	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_5170 m.64694	Techylectin-like protein	9.70E-58	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_5334 m.66725	--NA--	--NA--	C-type lectin	4.50E-14	C-type lectin	7.20E-08
paramphinome_s7_sc33_trim_unpaired_contig_5335 m.66735	--NA--	--NA--	C-type lectin	1.90E-15	C-type lectin	6.40E-15
paramphinome_s7_sc33_trim_unpaired_contig_53375 m.488694	Techylectin-like protein	8.90E-20	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_55837 m.505244	--NA--	--NA--	C-type lectin	3.40E-21	C-type lectin	1.40E-14
paramphinome_s7_sc33_trim_unpaired_contig_5589 m.69873	Gigantoxin	1.40E-21	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_56802 m.511760	Kazal	9.50E-18	Kazal	3.90E-18	Kazal	1.00E-15
paramphinome_s7_sc33_trim_unpaired_contig_5687 m.71135	--NA--	--NA--	Chitinase	5.00E-06	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_5942 m.74117	--NA--	--NA--	C-type lectin	1.90E-16	C-type lectin	9.50E-14
paramphinome_s7_sc33_trim_unpaired_contig_5953 m.74248	Antigen-5-like protein	2.20E-09	CAP	6.60E-15	CAP	2.00E-15
paramphinome_s7_sc33_trim_unpaired_contig_5985 m.74586	C-type lectin	7.20E-11	C-type lectin	9.90E-20	C-type lectin	2.00E-15
paramphinome_s7_sc33_trim_unpaired_contig_6003 m.74808	Metalloproteinase	2.70E-29	Metalloproteinase M12	3.90E-17	Metalloproteinase M12	9.00E-17
paramphinome_s7_sc33_trim_unpaired_contig_60075 m.533783	--NA--	--NA--	Chitinase	1.30E-07	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_6029 m.75169	Gigantoxin	7.00E-08	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_6077 m.75756	C-type lectin	9.70E-20	C-type lectin	3.00E-29	C-type lectin	1.10E-23
paramphinome_s7_sc33_trim_unpaired_contig_61148 m.540935	--NA--	--NA--	Lipocalin	8.90E-18	Lipocalin	9.10E-14

Contig	BLAST	E-value	HMM Full Sequence	E-value	HMM Domain	E-value
paramphinome_s7_sc33_trim_unpaired_contig_62717 m.551057	Peptidase S10	1.70E-62	Peptidase S10	3.30E-40	Peptidase S10	2.00E-41
paramphinome_s7_sc33_trim_unpaired_contig_6308 m.78632	--NA--	--NA--	C-type lectin	3.00E-19	C-type lectin	1.60E-14
paramphinome_s7_sc33_trim_unpaired_contig_6326 m.78804	Galactose-specific lectin nattectin	3.70E-07	C-type lectin	8.10E-19	C-type lectin	9.70E-12
paramphinome_s7_sc33_trim_unpaired_contig_63583 m.556702	Glutaminyl-peptide cyclotransferase	6.30E-18	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_6364 m.79284	--NA--	--NA--	Chitinase	5.20E-38	Chitinase	2.20E-35
paramphinome_s7_sc33_trim_unpaired_contig_6446 m.80237	Peptidase S1	4.70E-23	Peptidase S1	3.20E-33	Peptidase S1	2.00E-26
paramphinome_s7_sc33_trim_unpaired_contig_65355 m.568191	--NA--	--NA--	Lipocalin	2.30E-06	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_65 m.901	Phospholipase D SpaSicTox-beta1F1	1.30E-20	--NA--	--NA--	ShK-like	6.80E-06
paramphinome_s7_sc33_trim_unpaired_contig_6634 m.82340	--NA--	--NA--	C-type lectin	5.40E-27	C-type lectin	3.50E-17
paramphinome_s7_sc33_trim_unpaired_contig_66612 m.576003	--NA--	--NA--	Peptidase S1	2.40E-22	Peptidase S1	1.10E-18
paramphinome_s7_sc33_trim_unpaired_contig_6726 m.83467	Reticulocalbin-2	1.30E-56	--NA--	--NA--	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_683 m.8395	--NA--	--NA--	Hainantoxin	5.90E-06	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_6853 m.84933	Kunitz-type serine protease inhibitor	2.90E-23	Kunitz	1.00E-25	Kunitz	8.50E-24
paramphinome_s7_sc33_trim_unpaired_contig_6922 m.85777	--NA--	--NA--	--NA--	--NA--	C-type lectin	2.30E-06
paramphinome_s7_sc33_trim_unpaired_contig_6949 m.86014	--NA--	--NA--	Agatoxin	1.10E-08	Agatoxin	1.60E-07
paramphinome_s7_sc33_trim_unpaired_contig_70161 m.598150	--NA--	--NA--	C-type lectin	1.80E-11	C-type lectin	2.40E-10
paramphinome_s7_sc33_trim_unpaired_contig_7018 m.86928	--NA--	--NA--	C-type lectin	4.40E-20	C-type lectin	9.90E-15
paramphinome_s7_sc33_trim_unpaired_contig_7117 m.88043	--NA--	--NA--	CAP	7.90E-16	CAP	2.50E-12
paramphinome_s7_sc33_trim_unpaired_contig_7526 m.92941	C-type lectin	4.60E-39	C-type lectin	4.30E-21	C-type lectin	3.40E-18
paramphinome_s7_sc33_trim_unpaired_contig_7556 m.93268	Conoposin-Cn1	4.30E-07	Actinoporin	6.10E-06	--NA--	--NA--
paramphinome_s7_sc33_trim_unpaired_contig_7624 m.93973	Peptidase S10	5.20E-108	Peptidase S10	7.20E-31	Peptidase S10	2.40E-32
paramphinome_s7_sc33_trim_unpaired_contig_8541 m.104670	C-type lectin	7.30E-15	C-type lectin	1.50E-21	C-type lectin	3.90E-19
paramphinome_s7_sc33_trim_unpaired_contig_8566 m.104921	--NA--	--NA--	C-type lectin	5.00E-28	C-type lectin	1.70E-20
paramphinome_s7_sc33_trim_unpaired_contig_8620 m.105555	--NA--	--NA--	C-type lectin	2.10E-23	C-type lectin	4.80E-17
paramphinome_s7_sc33_trim_unpaired_contig_9031 m.110256	Serpin	2.70E-26	Serpin	1.40E-34	Serpin	3.90E-32
paramphinome_s7_sc33_trim_unpaired_contig_9032 m.110265	Serpin	1.40E-26	Serpin	5.00E-36	Serpin	1.30E-33
paramphinome_s7_sc33_trim_unpaired_contig_930 m.11296	Chitinase	2.50E-72	Chitinase	6.10E-81	Chitinase	7.30E-74
paramphinome_s7_sc33_trim_unpaired_contig_9338 m.113844	--NA--	--NA--	Metalloproteinase M12	2.00E-15	Metalloproteinase M12	5.30E-13
paramphinome_s7_sc33_trim_unpaired_contig_9399 m.114524	Serpin	1.00E-81	Serpin	2.10E-108	Serpin	1.10E-105
paramphinome_s7_sc33_trim_unpaired_contig_9727 m.118259	--NA--	--NA--	Kazal	2.50E-17	Kazal	2.80E-13
paramphinome_s7_sc33_trim_unpaired_contig_9734 m.118319	--NA--	--NA--	Peptidase S1	7.00E-16	Peptidase S1	1.20E-11
paramphinome_s7_sc33_trim_unpaired_contig_9904 m.120289	--NA--	--NA--	C-type lectin	8.60E-26	C-type lectin	3.20E-17
paramphinome_s7_sc33_trim_unpaired_contig_9978 m.121104	--NA--	--NA--	C-type lectin	5.80E-12	C-type lectin	6.30E-08