

# **Supplementary material for A comprehensive analysis of bilaterian mitochondrial genomes and animal phylogeny**

This file contains the supplementary material for the paper:

1. The phylogeny for the 300 species data set.
2. The plots for nucleotide contents and fractions of the considered amino acid sets for the other genes and the concatenated alignment.
3. Detailed information on the used outgroups and species list for the metazoan data sets.
4. Detailed information for the other data sets which are discussed in the other chapters of the special issue.

Phylogenetic tree obtained with an alignment of amino acid alignments from the data set reduced to 300 taxa (phylogenetic methods as for Figure 1 in the main text). Numbers above branches are bootstrap percentages. Branches with bootstrap support below 85% are shown in gray. Numbers in brackets after taxon names are the number of species representing this taxon in this reduced data set.

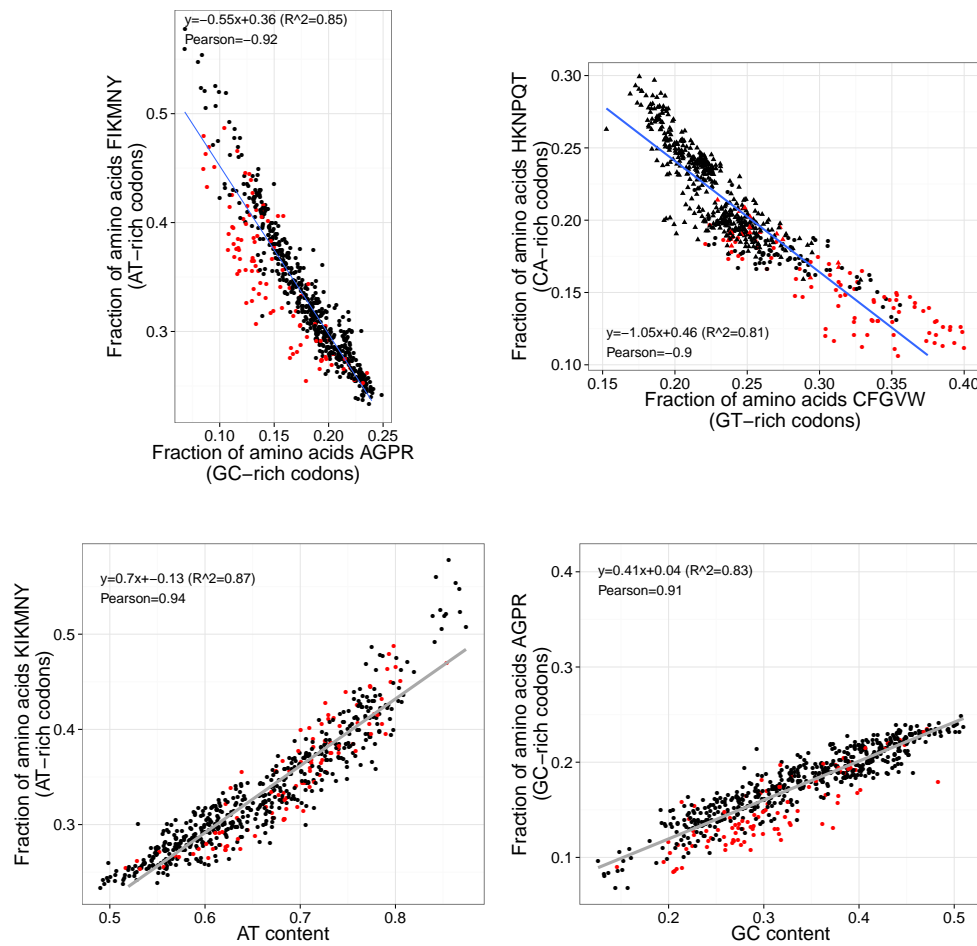


## Supplement 2

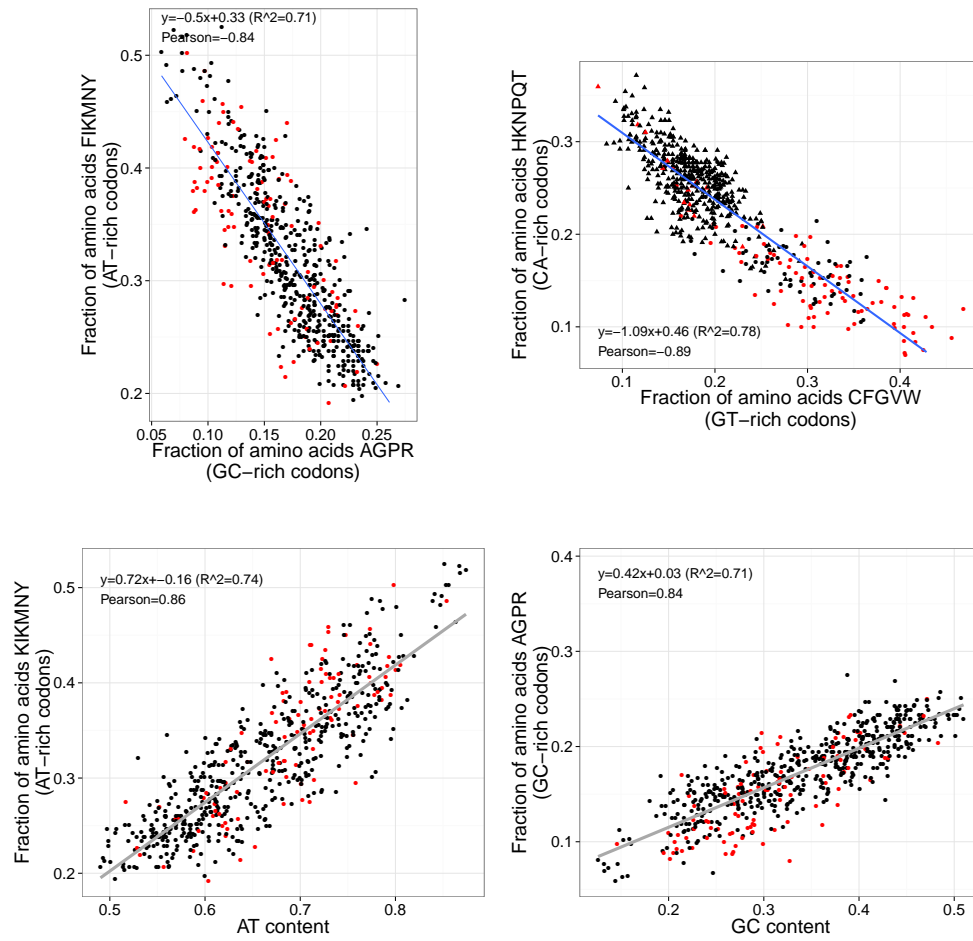
Plots of the AT/GC-content of the mito genome sequences and the fractions of amino acids with AT/GC/CA/GT rich codons found in an alignment. Shown are from top left to bottom right: fraction of GC-rich vs. AT-rich codons, fraction of GT-rich vs. CA-rich codons, AT-content vs. fraction of AT-rich codons, GC-content vs. fraction of GC-rich codons. Triangles mark genes located on the CA rich strand (only for the GT-rich codons vs. CA-rich codons). Red data points mark species with long branches and unusual phylogenetic position in the tree shown in Figure 1 (Nematodes, Platyhelminthes, Syndermata, Acari, Tunicata, some hexapods, and molluscs).

The following present this for each of the protein coding genes and the concatenated alignment all genes after the noisy filter has been applied (ALL-Noisy). In the latter plot the triangles mark mito genomes with CA rich plus strand.

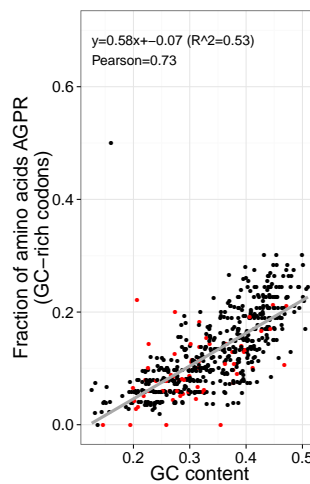
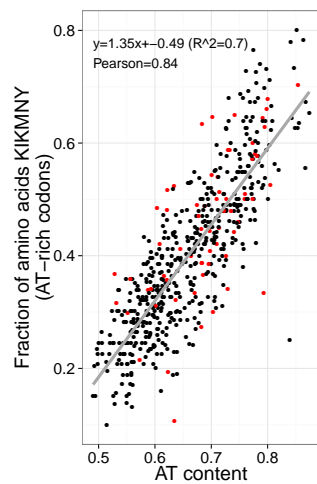
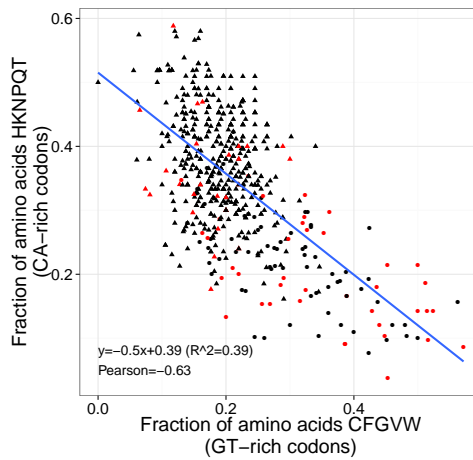
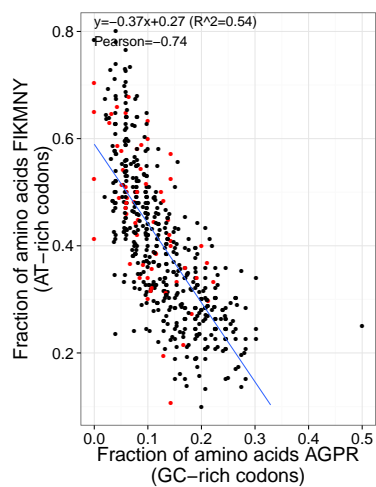
### ALL-Noisy



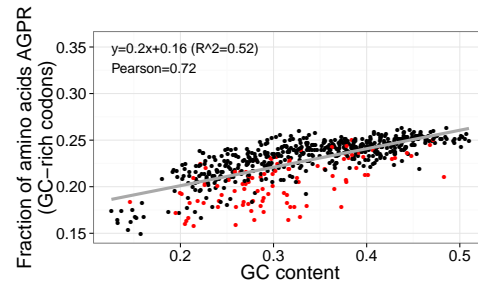
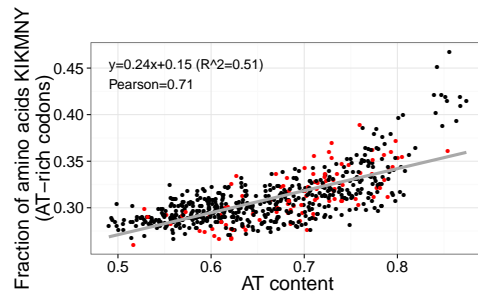
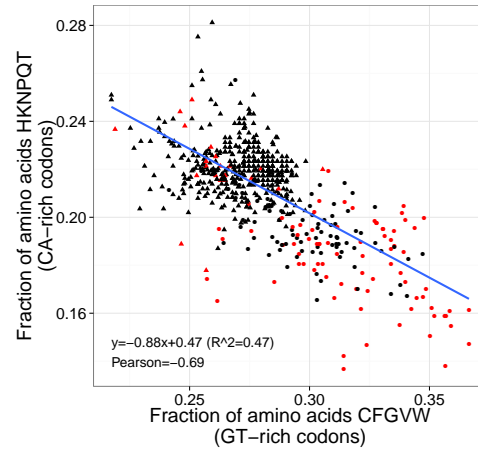
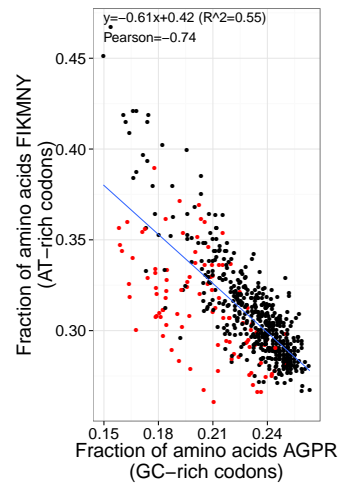
*atp6*



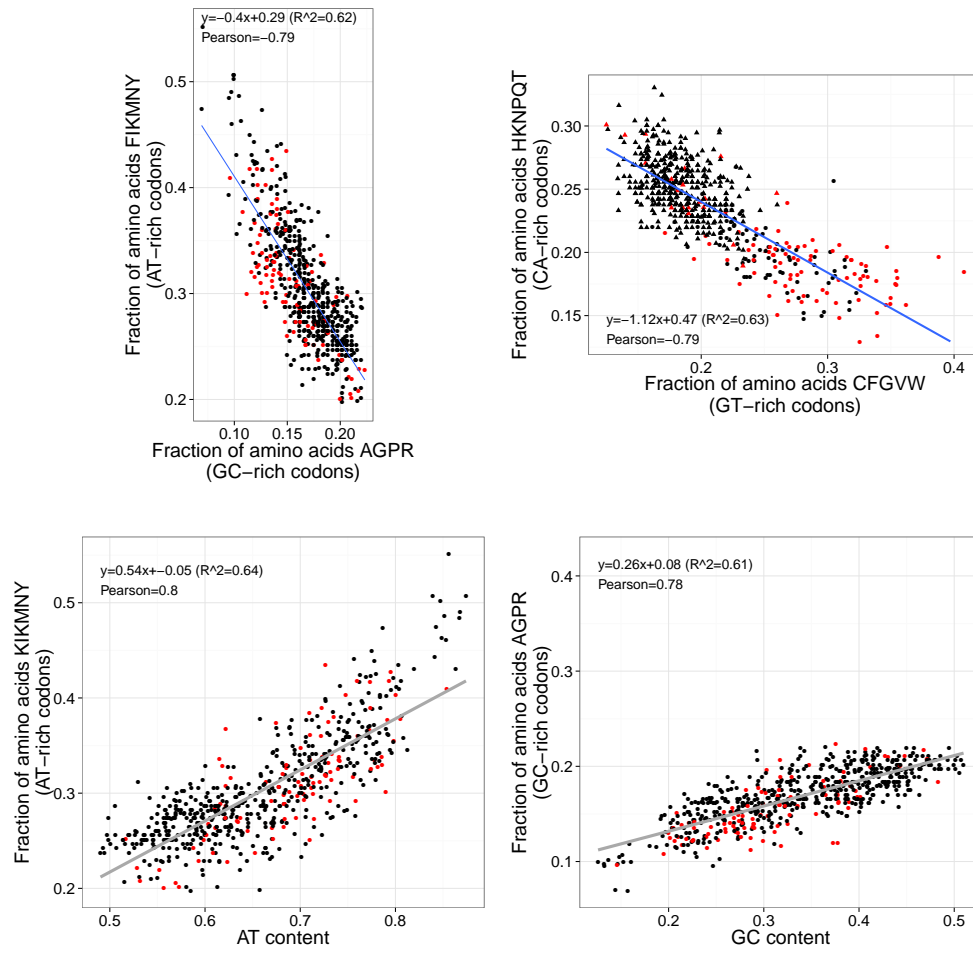
*atp8*



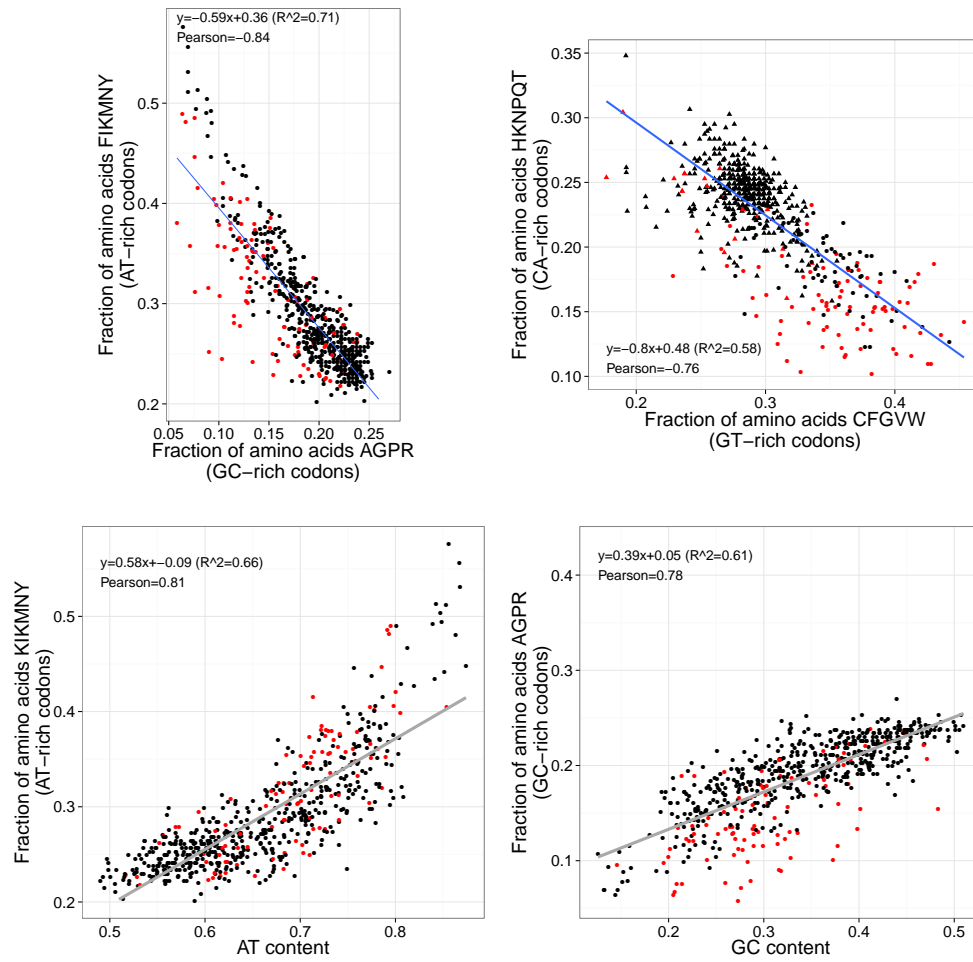
*cox1*



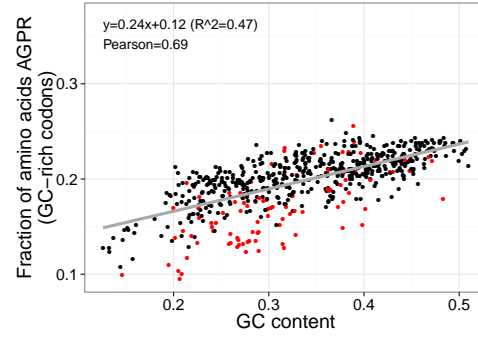
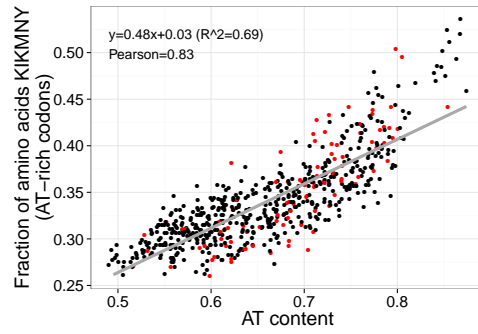
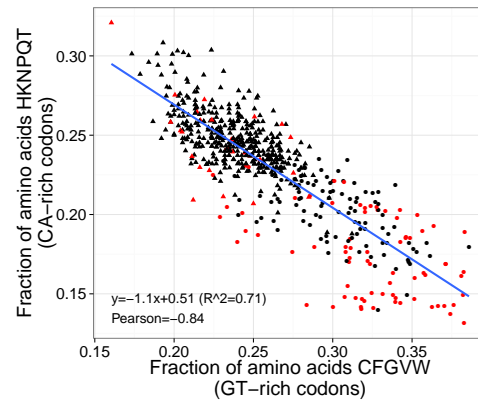
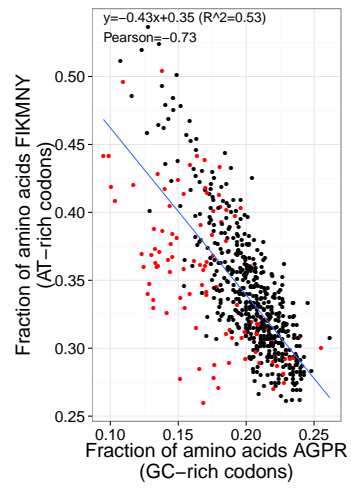
*cox2*



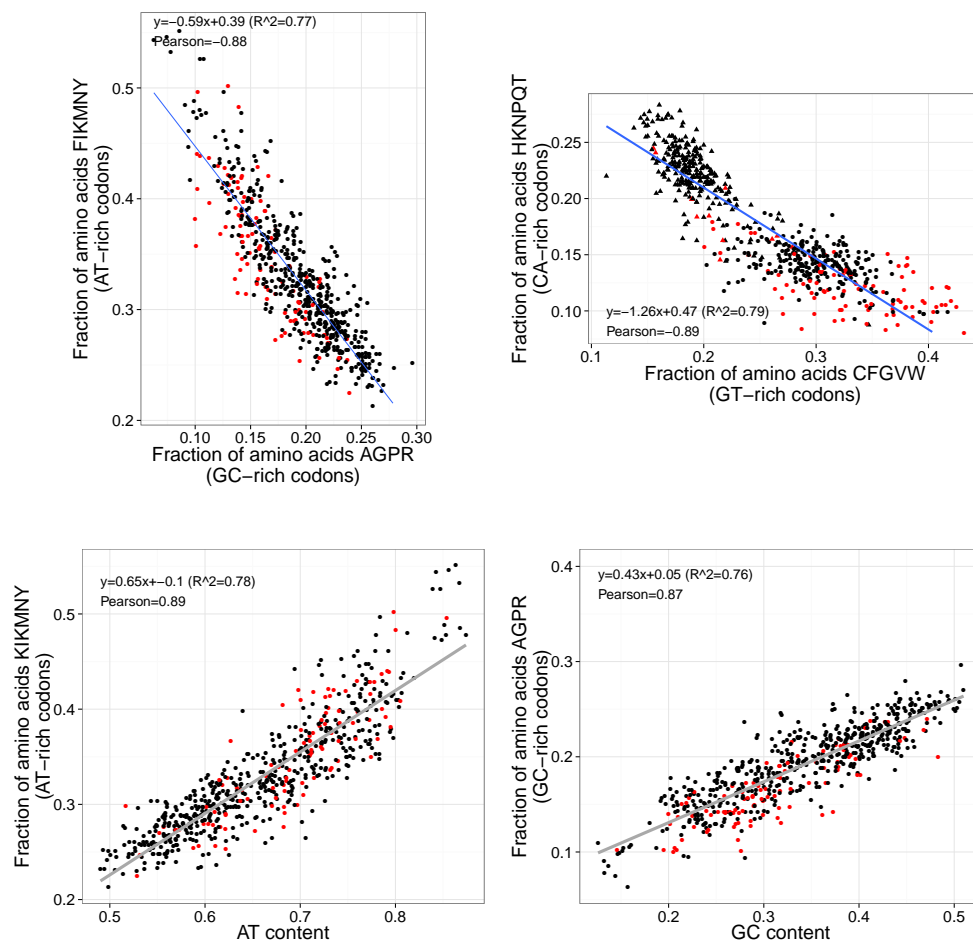
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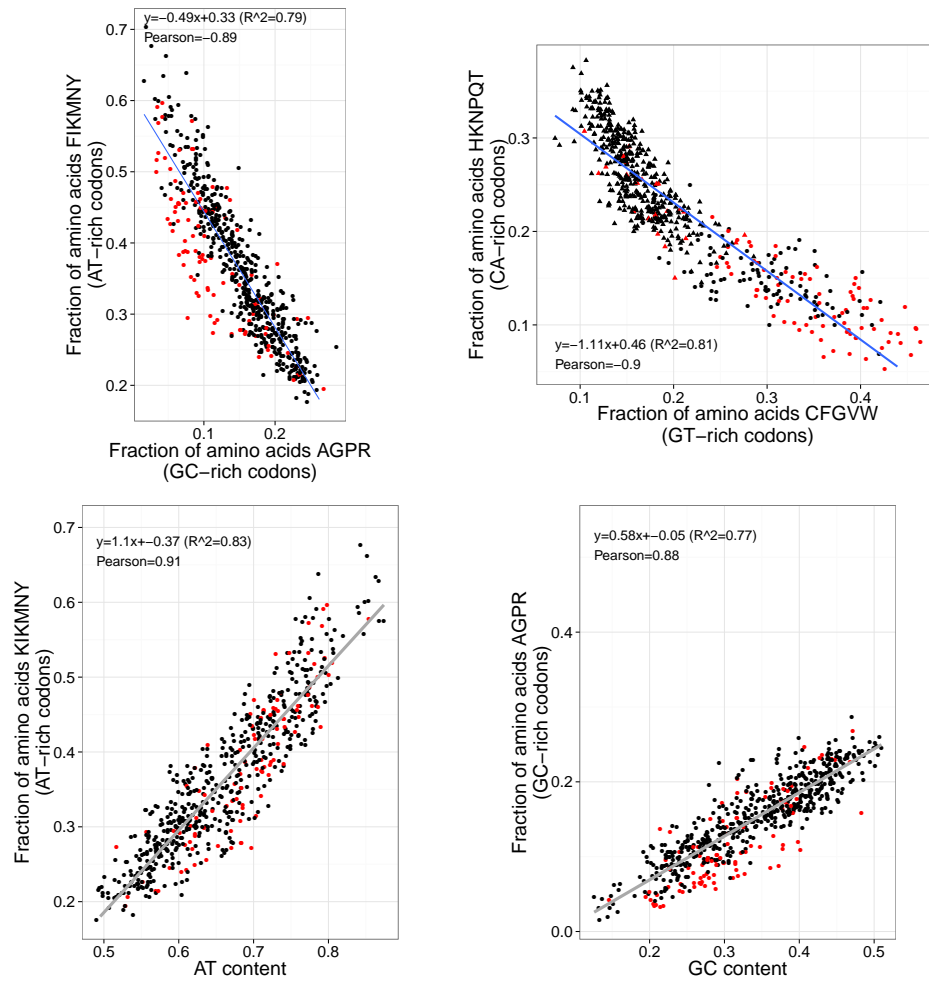
*cytb*



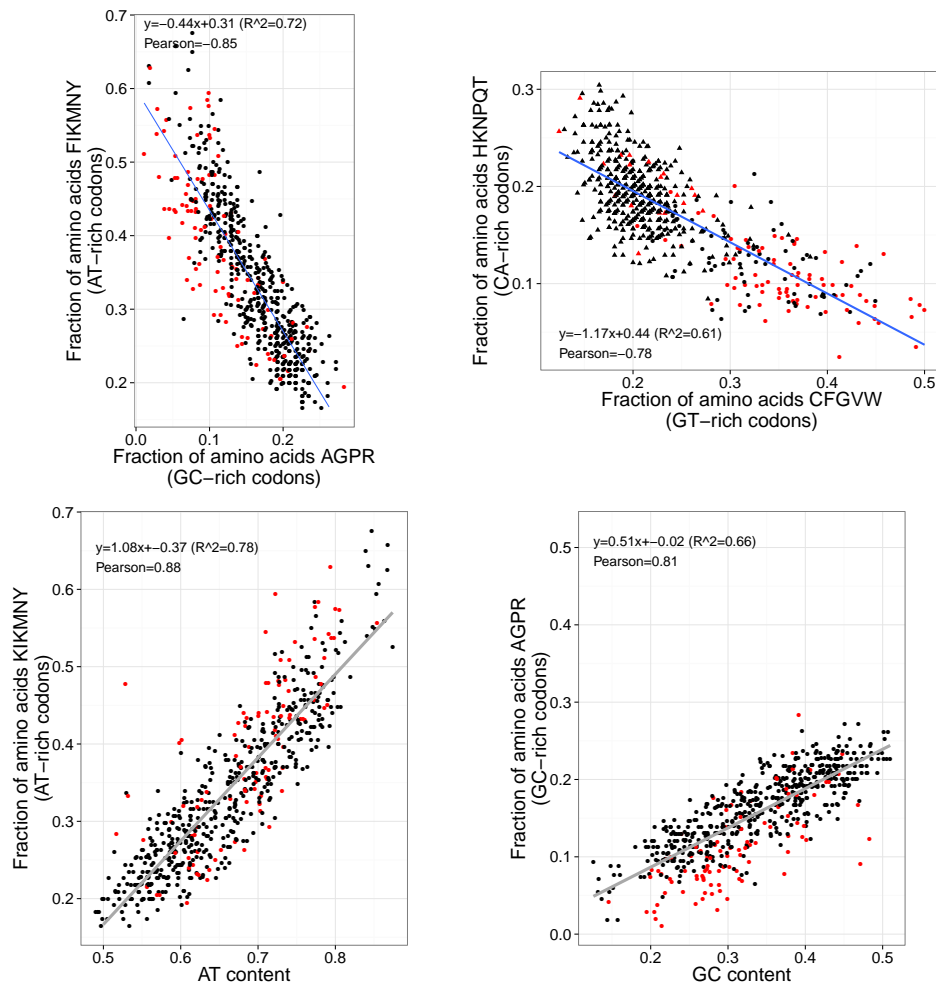
*nad1*



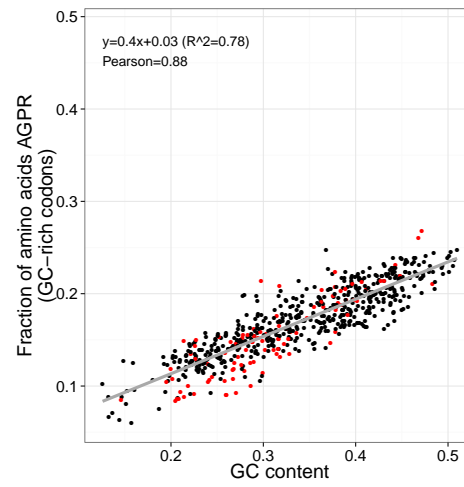
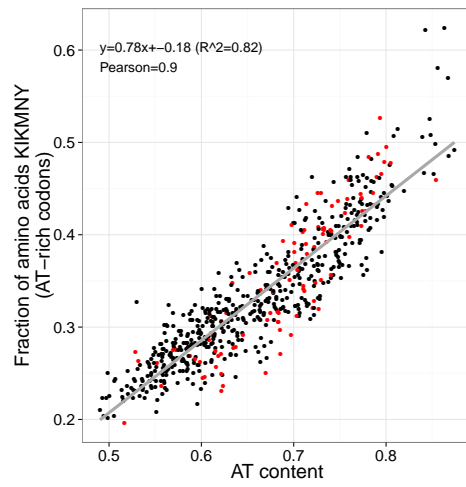
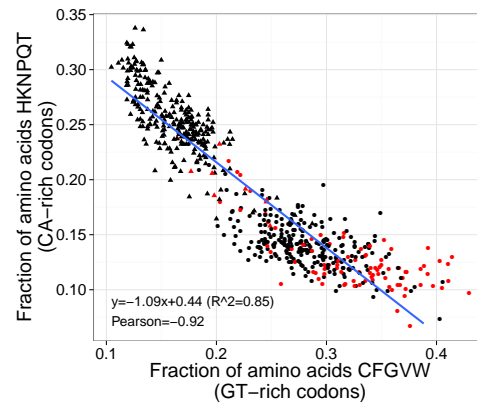
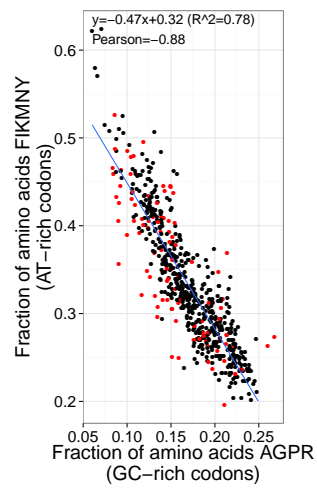
*nad2*



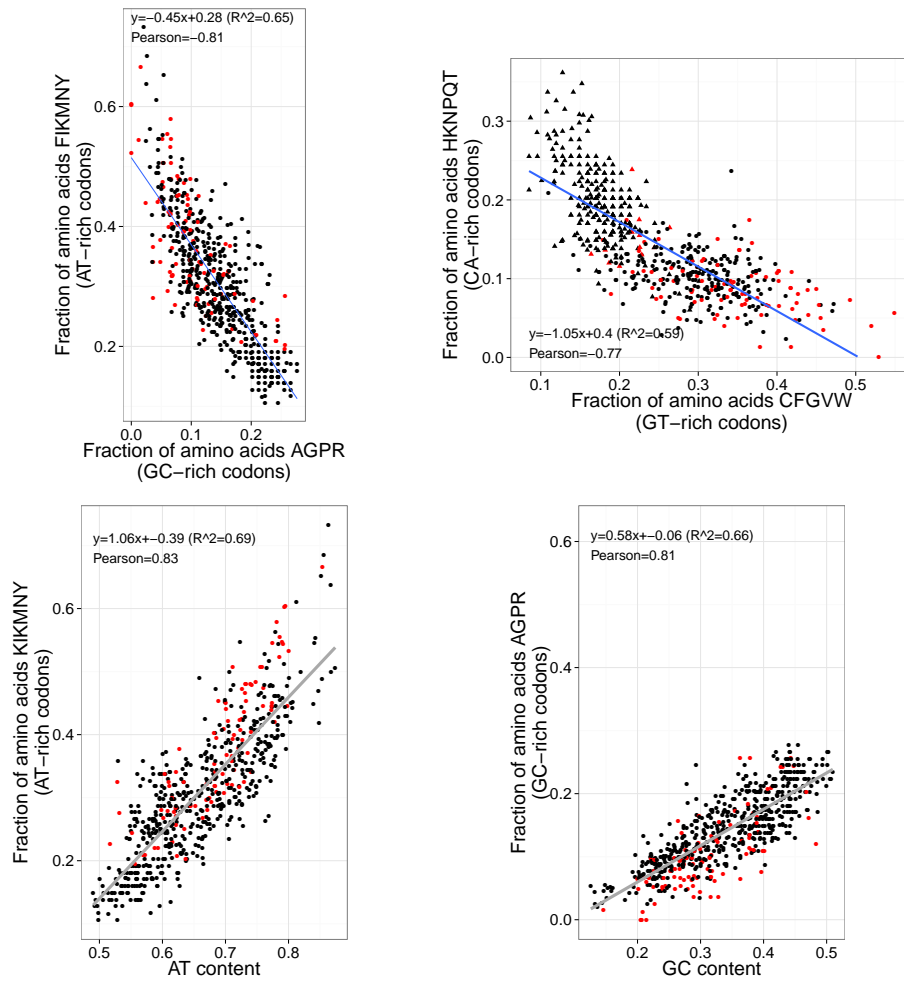
*nad3*



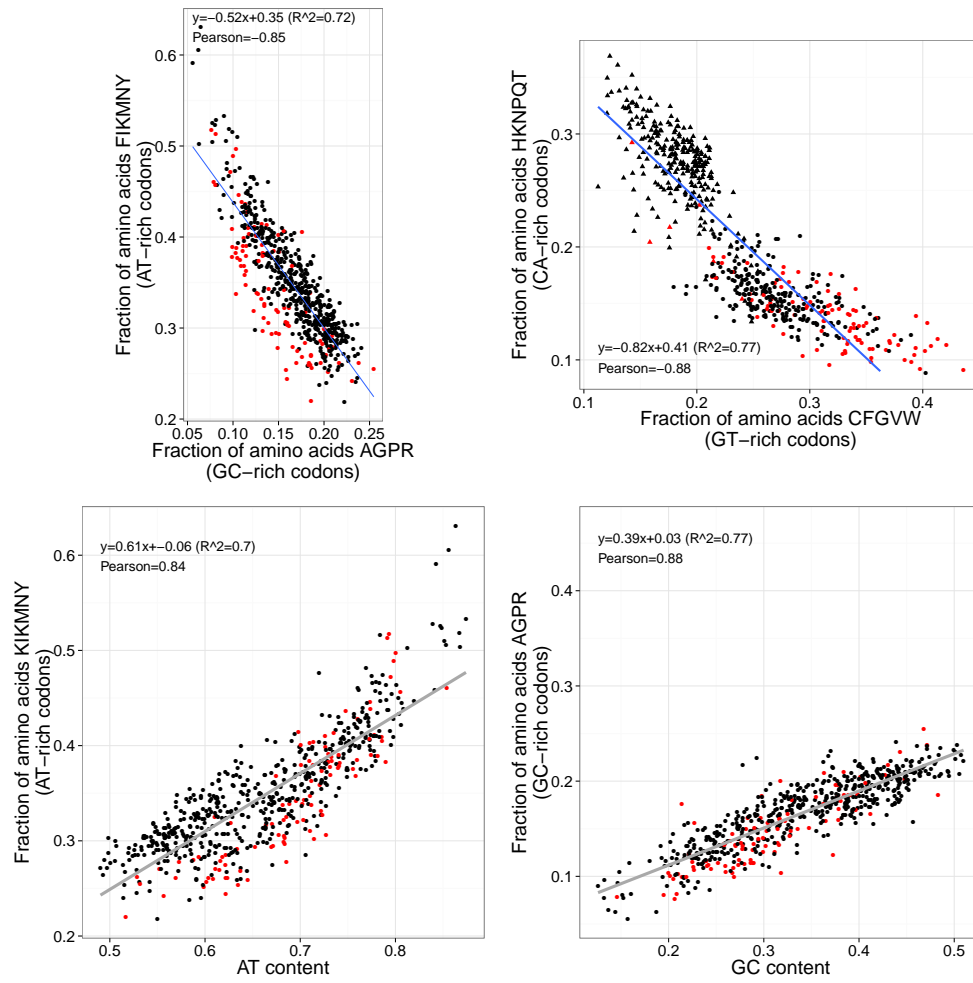
*nad4*



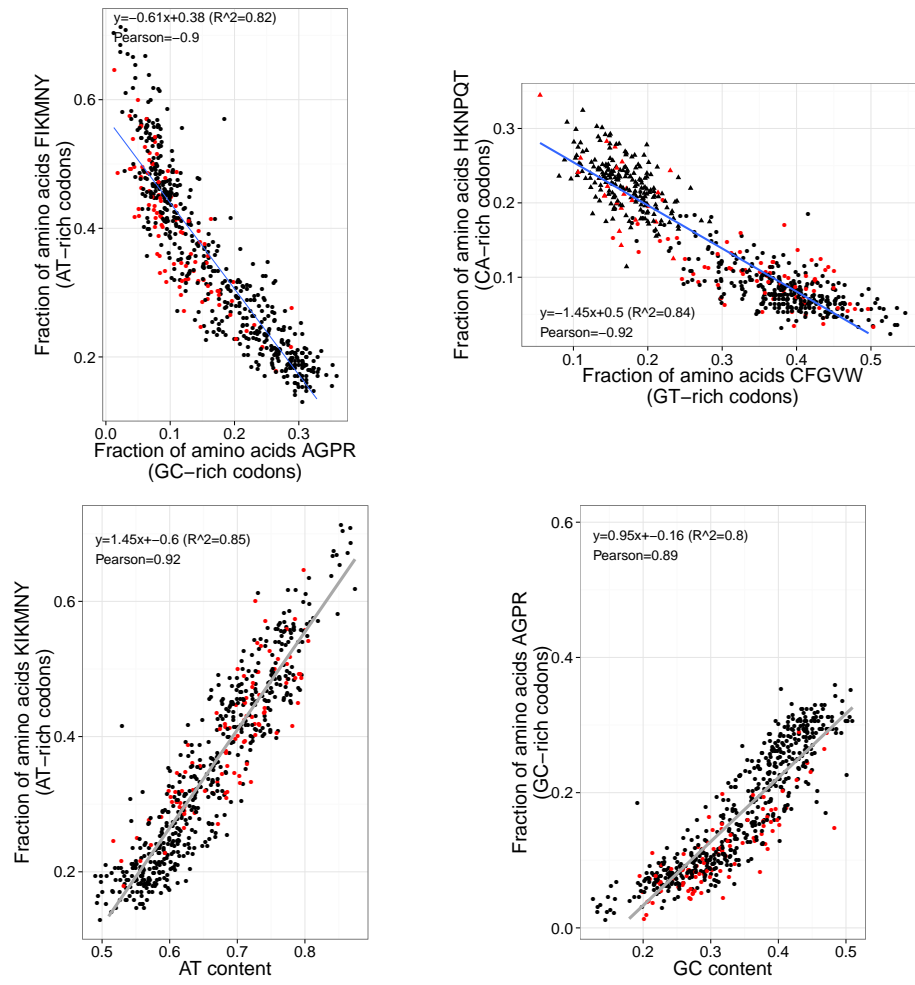
*nad4l*



*nad5*



*nad6*



## Supplement 3

### Additional metazoan sequences

Overview of the additional metazoan sequences used in the analyses. The table lists the data source (Accession number (RefSeq), O. Rota-Stabelli (ORS), J. Dambach (JD), A. Braband (AB), L. Podsiadlowski (LP)), the species name, and the genetic code table number (gb: as given in GenBank file, aa: present as amino acid sequence)

Source	Name	Code
ORS (NC_014848)	<i>Hypsibius dujardini</i>	aa
ORS (HM600782)	<i>ON Peripatoides sp</i>	aa
ORS	(NC_015829) <i>TA Thulinia sp</i>	aa
JD	<i>Acerentomon franzi</i>	5
JD	<i>Cordulia aenea</i>	5
AB	<i>Pycnogonum litorale</i>	5
AB	<i>Macrobiotus hufelandi</i>	5
AB	marbled crayfish	5
LP (JN832704)	<i>Phoronopsis harmeri</i>	5
LP (NC_014578)	<i>Symsagittifera roscoffensis</i>	5
EU583500	<i>Euphausia superba</i>	5
NC_014850	<i>Oscarella microlobata</i>	gb
NC_014868	<i>Plakortis simplex</i>	gb

## Additional outgroup species

Additional outgroup sequences used in the analyses. Given are the data source (Accession number (RefSeq), F. Lang (FL)), the species name, and the genetic code table number (aa: present as amino acid sequence)

Source	Name	Code
FL	<i>Capsaspora owczarzaki</i>	aa
FL	<i>Allomyces macrogynus</i>	aa
FL	<i>Blastocladiella emersonii</i>	aa
FL	<i>Rhizopus stolonifer</i>	aa
FL	<i>Ministeria vibrans</i>	aa
FL	<i>Nuclearia simplex</i>	aa
FL	<i>Monosiga brevicolis</i>	aa
FL	<i>Amoebidium parasiticum</i>	aa
NC_003052	<i>Spizellomyces punctatus</i>	16
NC_003053	<i>Rhizophydium sp. 136</i>	16
NC_001224	<i>Saccharomyces cerevisiae</i>	4
NC_001326	<i>Schizosaccharomyces pombe</i>	4
NC_001715	<i>Allomyces macrogynus</i>	4
NC_003048	<i>Hyaloraphidium curvatum</i>	4
NC_004309	<i>Monosiga brevicollis ATCC 50154</i>	4
NC_004336	<i>Cryptococcus neoformans var. grubii</i>	4
NC_004514	<i>Lecanicillium muscarium</i>	4
NC_004624	<i>Monoblepharella sp. JEL15</i>	4
NC_004760	<i>Harpochytrium sp. JEL94</i>	4
NC_005256	<i>Penicillium marneffeii</i>	4
NC_005927	<i>Moniliophthora perniciosa</i>	4
NC_006836	<i>Rhizopus oryzae</i>	4
NC_006837	<i>Smittium culisetae</i>	4
NC_006838	<i>Mortierella verticillata</i>	4
NC_008368	<i>Ustilago maydis</i>	4
NC_011360	<i>Blastocladiella emersonii</i>	4
NC_012056	<i>Glomus intraradices</i>	4
NC_013660	<i>Pneumocystis carinii</i>	4

## Whitelist of Species used for Pruning

All species from additional metazoan species listed above and the outgroup sequences from FL in the above table. Furthermore the following species:

NC\_000834, NC\_000844, NC\_000875, NC\_000931, NC\_000933, NC\_000941, NC\_001131, NC\_001566, NC\_001620, NC\_001626, NC\_001636, NC\_001673, NC\_001712, NC\_001887, NC\_002010, NC\_002184, NC\_002322, NC\_002355, NC\_002609, NC\_002629, NC\_002639, NC\_002651, NC\_002735, NC\_002807, NC\_003057, NC\_003081, NC\_003086, NC\_003343, NC\_003344, NC\_003372, NC\_003522, NC\_003979, NC\_004309, NC\_004371, NC\_004447, NC\_004454, NC\_004465, NC\_004610, NC\_004816, NC\_005306, NC\_005437, NC\_005781, NC\_005870, NC\_005924, NC\_005929, NC\_005934, NC\_005935, NC\_005936, NC\_005937, NC\_005938, NC\_005940, NC\_005963, NC\_006075, NC\_006076, NC\_006079, NC\_006080, NC\_006081, NC\_006083, NC\_006133, NC\_006157, NC\_006293, NC\_006379, NC\_006386, NC\_006464, NC\_006465, NC\_006892, NC\_006894, NC\_006895, NC\_006990, NC\_007214, NC\_007438, NC\_007444, NC\_007688, NC\_007689, NC\_007701, NC\_007702, NC\_007980, NC\_008071, NC\_008073, NC\_008151, NC\_008157, NC\_008159, NC\_008161, NC\_008164, NC\_008166, NC\_008192, NC\_008233, NC\_008411, NC\_008412, NC\_008453, NC\_008556, NC\_008557, NC\_008572, NC\_008742, NC\_008827, NC\_008831, NC\_008832, NC\_008833, NC\_008834, NC\_009082, NC\_009498, NC\_009626, NC\_009724, NC\_009797, NC\_009834, NC\_009984, NC\_009985, NC\_010197, NC\_010198, NC\_010201, NC\_010203, NC\_010204, NC\_010208, NC\_010211, NC\_010430, NC\_010431, NC\_010432, NC\_010533, NC\_010536, NC\_010691, NC\_010765, NC\_010766, NC\_010961, NC\_011016, NC\_011277, NC\_011293, NC\_011359, NC\_011524, NC\_011572, NC\_011594, NC\_011820, NC\_011823, NC\_011826, NC\_012644, NC\_012645, NC\_012887, NC\_012889, NC\_012901, NC\_013032, NC\_013180, NC\_013185, NC\_013251, NC\_013256, NC\_013257, NC\_013561, NC\_013568, NC\_013573, NC\_013662, NC\_013810, NC\_013814, NC\_013877, NC\_013881, NC\_014273, and NC\_010472\_010484 (Brachionus).

## Species list

This is the list of 684 species in the **Metazoa** data set. Species included in the smaller data sets **Metazoa-300** and **Metazoa-100** are indicated with ✓. The Table is sorted by the taxonomic group and species name. The species corresponding to the “Additional metazoan sequences” and the “Additional outgroup species” from FL are given at the very end of the table. For these species the column “Accession” gives the name used in the data set if different from the species name.

Group	Name	Accession	Metazoa-300	Metazoa-100
Acanthocephala	<i>Leptorhynchoides thecatus</i>	NC.006892	✓	✓
Annelida	<i>Clymenella torquata</i>	NC.006321		
Annelida	<i>Lumbricus terrestris</i>	NC.001673	✓	✓
Annelida	<i>Nephtys</i> sp. 'San Juan Island' YV-2008	NC.010559		
Annelida	<i>Orbinia latreillii</i>	NC.007933		
Annelida	<i>Perionyx excavatus</i>	NC.009631		
Annelida	<i>Pista cristata</i>	NC.011011		
Annelida	<i>Platynereis dumerilii</i>	NC.000931	✓	✓
Annelida	<i>Terebellides stroemi</i>	NC.011014		
Annelida	<i>Whitmania pigra</i>	NC.013569	✓	
Arthropoda	<i>Abispa ephippium</i>	NC.011520	✓	
Arthropoda	<i>Achelia bituberculata</i>	NC.009724	✓	✓
Arthropoda	<i>Acmaeodera</i> sp. NCS-2009	NC.013580		
Arthropoda	<i>Acyrtosiphon pisum</i>	NC.011594	✓	
Arthropoda	<i>Adelium</i> sp. NCS-2009	NC.013554		
Arthropoda	<i>Aedes albopictus</i>	NC.006817		
Arthropoda	<i>Aeschyntelus notatus</i>	NC.012446		
Arthropoda	<i>Aleurochiton aceris</i>	NC.006160		
Arthropoda	<i>Aleurodicus dugesii</i>	NC.005939	✓	
Arthropoda	<i>Amblyomma triguttatum</i>	NC.005963	✓	
Arthropoda	<i>Anabrus simplex</i>	NC.009967		
Arthropoda	<i>Anopheles gambiae</i>	NC.002084		
Arthropoda	<i>Anopheles quadrimaculatus</i> A	NC.000875	✓	
Arthropoda	<i>Anoplophora glabripennis</i>	NC.008221		
Arthropoda	<i>Antrokoreana gracilipes</i>	NC.010221	✓	
Arthropoda	<i>Apatides fortis</i>	NC.013582		
Arthropoda	<i>Apis mellifera ligustica</i>	NC.001566	✓	
Arthropoda	<i>Argulus americanus</i>	NC.005935	✓	✓
Arthropoda	<i>Armillifer armillatus</i>	NC.005934	✓	✓
Arthropoda	<i>Artemia franciscana</i>	NC.001620	✓	✓
Arthropoda	<i>Artogeia melete</i>	NC.010568		
Arthropoda	<i>Ascaloptynx appendiculatus</i>	NC.011277	✓	
Arthropoda	<i>Ascoschoengastia</i> sp. TATW-1	NC.010596		

Group	Name	Accession	Metazoa-300	Metazoa-100
Arthropoda	<i>Atelura formicaria</i>	NC_011197		
Arthropoda	<i>Atractomorpha sinensis</i>	NC_011824		
Arthropoda	<i>Bemisia tabaci</i>	NC_006279		
Arthropoda	<i>Bilobella aurantiaca</i>	NC_011195	✓	
Arthropoda	<i>Blattella germanica</i>	NC_012901	✓	
Arthropoda	<i>Bombus hypocrita sapporoensis</i>	NC_011923		
Arthropoda	<i>Bombus ignitus</i>	NC_010967		
Arthropoda	<i>Bombyx mori</i>	NC_002355	✓	
Arthropoda	<i>Bothriometopus macrocnemis</i>	NC_009983	✓	
Arthropoda	<i>Bothropolys sp. SP-2004</i>	NC_009458		
Arthropoda	<i>Buthus occitanus</i>	NC_010765	✓	✓
Arthropoda	<i>Calisoga longitarsis</i>	NC_010780	✓	
Arthropoda	<i>Calliptamus italicus</i>	NC_011305		
Arthropoda	<i>Campanulotes bidentatus compar</i>	NC_007884	✓	
Arthropoda	<i>Campodea fragilis</i>	NC_008233	✓	✓
Arthropoda	<i>Campodea lubbocki</i>	NC_008234	✓	
Arthropoda	<i>Carios capensis</i>	NC_005291		
Arthropoda	<i>Centruroides limpidus</i>	NC_006896		
Arthropoda	<i>Cephus cinctus</i>	NC_012688	✓	
Arthropoda	<i>Chaetosoma scaritides</i>	NC_011324		
Arthropoda	<i>Chauliognathus opacus</i>	NC_013576		
Arthropoda	<i>Cherax destructor</i>	NC_011243		
Arthropoda	<i>Chrysochroa fulgidissima</i>	NC_012765		
Arthropoda	<i>Coptosoma bifaria</i>	NC_012449		
Arthropoda	<i>Corydalus cornutus</i>	NC_011276		
Arthropoda	<i>Crioceris duodecimpunctata</i>	NC_003372	✓	
Arthropoda	<i>Cryptopygus antarcticus</i>	NC_010533	✓	
Arthropoda	<i>Culicoides arakawae</i>	NC_009809		
Arthropoda	<i>Cydistomyia duplonotata</i>	NC_008756	✓	
Arthropoda	<i>Cyphon sp. BT0012</i>	NC_011320		
Arthropoda	<i>Damon diadema</i>	NC_011293	✓	✓
Arthropoda	<i>Daphnia pulex</i>	NC_000844	✓	✓
Arthropoda	<i>Davidius lunatus</i>	NC_012644	✓	✓
Arthropoda	<i>Dermatophagoides farinae</i>	NC_013184	✓	
Arthropoda	<i>Dermatophagoides pteronyssinus</i>	NC_012218	✓	
Arthropoda	<i>Diadegma semiclausum</i>	NC_012708		
Arthropoda	<i>Ditaxis biseriata</i>	NC_013257	✓	
Arthropoda	<i>Drosophila simulans</i>	NC_005781	✓	
Arthropoda	<i>Dysdercus cingulatus</i>	NC_012421		
Arthropoda	<i>Enithares tibialis</i>	NC_012819		
Arthropoda	<i>Eophreatoicus sp. 14 FK-2009</i>	NC_013976	✓	

Group	Name	Accession	Metazoa-300	Metazoa-100
Arthropoda	<i>Ephemera orientalis</i>	NC_012645	✓	
Arthropoda	<i>Eremobates cf. palpisetulosus SEM-2008</i>	NC_010779		
Arthropoda	<i>Eriochair japonica</i>	NC_011597		
Arthropoda	<i>Evania appendigaster</i>	NC_013238	✓	
Arthropoda	<i>Friesea grisea</i>	NC_010535		
Arthropoda	<i>Geisha distinctissima</i>	NC_012617		
Arthropoda	<i>Geocoris pallidipennis</i>	NC_012424		
Arthropoda	<i>Geothelphusa dehaani</i>	NC_007379		
Arthropoda	<i>Gerris sp. NKMT033</i>	NC_012841		
Arthropoda	<i>Gomphiocephalus hodgsoni</i>	NC_005438		
Arthropoda	<i>Gryllotalpa orientalis</i>	NC_006678		
Arthropoda	<i>Gryllotalpa pluvialis</i>	NC_011302		
Arthropoda	<i>Habronattus oregonensis</i>	NC_005942		
Arthropoda	<i>Haemaphysalis flava</i>	NC_005292		
Arthropoda	<i>Halocaridina rubra</i>	NC_008413		
Arthropoda	<i>Halyomorpha halys</i>	NC_013272		
Arthropoda	<i>Harpiosquilla harpax</i>	NC_006916		
Arthropoda	<i>Heptathela hangzhouensis</i>	NC_005924	✓	✓
Arthropoda	<i>Heterodorus macropus</i>	NC_002651	✓	
Arthropoda	<i>Homalodisca vitripennis</i>	NC_006899		
Arthropoda	<i>Hutchinsoniella macracantha</i>	NC_005937	✓	✓
Arthropoda	<i>Hydaropsis longirostris</i>	NC_012456		
Arthropoda	<i>Hydrometra sp. NKMT020</i>	NC_012842		
Arthropoda	<i>Hydroscapha granulum</i>	NC_012144		
Arthropoda	<i>Hyphantria cunea</i>	NC_014058		
Arthropoda	<i>Hypochilus thorelli</i>	NC_010777		
Arthropoda	<i>Hypoderma lineatum</i>	NC_013932		
Arthropoda	<i>Ilyocoris cimicoides</i>	NC_012845		
Arthropoda	<i>Ixodes hexagonus</i>	NC_002010	✓	
Arthropoda	<i>Ixodes holocyclus</i>	NC_005293		
Arthropoda	<i>Ixodes persulcatus</i>	NC_004370		
Arthropoda	<i>Ixodes uriae</i>	NC_006078		
Arthropoda	<i>Japyx solifugus</i>	NC_007214	✓	✓
Arthropoda	<i>Laccotrephes robustus</i>	NC_012817	✓	
Arthropoda	<i>Laodelphax striatellus</i>	NC_013706	✓	
Arthropoda	<i>Lepeophtheirus salmonis</i>	NC_007215	✓	
Arthropoda	<i>Lepidopsocidae sp. RS-2001</i>	NC_004816	✓	
Arthropoda	<i>Leptotrombidium deliense</i>	NC_007600		
Arthropoda	<i>Leptotrombidium pallidum</i>	NC_007177	✓	
Arthropoda	<i>Ligia oceanica</i>	NC_008412	✓	
Arthropoda	<i>Limulus polyphemus</i>	NC_003057	✓	✓

Group	Name	Accession	Metazoa-300	Metazoa-100
Arthropoda	<i>Lithobius forficatus</i>	NC_002629	✓	✓
Arthropoda	<i>Litopenaeus vannamei</i>	NC_009626	✓	✓
Arthropoda	<i>Locusta migratoria</i>	NC_001712	✓	
Arthropoda	<i>Lucanus mazama</i>	NC_013578		
Arthropoda	<i>Lycorma delicatula</i>	NC_012835		
Arthropoda	<i>Macrobrachium lanchesteri</i>	NC_012217		
Arthropoda	<i>Macrobrachium rosenbergii</i>	NC_006880		
Arthropoda	<i>Macrogyrus oblongus</i>	NC_013249		
Arthropoda	<i>Macroscytus subaeneus</i>	NC_012457		
Arthropoda	<i>Malcus inconspicuus</i>	NC_012458		
Arthropoda	<i>Marsupenaeus japonicus</i>	NC_007010	✓	
Arthropoda	<i>Mastigoproctus giganteus</i>	NC_010430	✓	✓
Arthropoda	<i>Mayetiola destructor</i>	NC_013066		
Arthropoda	<i>Megabalanus volcano</i>	NC_006293	✓	✓
Arthropoda	<i>Melipona bicolor</i>	NC_004529	✓	
Arthropoda	<i>Mesobuthus gibbosus</i>	NC_006515		
Arthropoda	<i>Metacrangonyx longipes</i>	NC_013032	✓	
Arthropoda	<i>Metaseiulus occidentalis</i>	NC_009093	✓	
Arthropoda	<i>Mongoloraphidia harmandi</i>	NC_013251	✓	
Arthropoda	<i>Mordella atrata</i>	NC_013254		
Arthropoda	<i>Myrmecophilus manni</i>	NC_011301		
Arthropoda	<i>Narceus annularus</i>	NC_003343	✓	✓
Arthropoda	<i>Neomaskellia andropogonis</i>	NC_006159	✓	
Arthropoda	<i>Neopanorpa pulchra</i>	NC_013180	✓	
Arthropoda	<i>Nephila clavata</i>	NC_008063	✓	
Arthropoda	<i>Nerthra sp. NKMT022</i>	NC_012838		
Arthropoda	<i>Nesomachilis australica</i>	NC_006895	✓	
Arthropoda	<i>Neuroctenus parus</i>	NC_012459		
Arthropoda	<i>Nezara viridula</i>	NC_011755		
Arthropoda	<i>Nothopuga sp. 1 LP-2008</i>	NC_009984	✓	✓
Arthropoda	<i>Nymphon gracile</i>	NC_008572	✓	✓
Arthropoda	<i>Ochterus marginatus</i>	NC_012820		
Arthropoda	<i>Ognevia longipennis</i>	NC_013701		
Arthropoda	<i>Onisimus nanseni</i>	NC_013819	✓	
Arthropoda	<i>Onychiurus orientalis</i>	NC_006074		
Arthropoda	<i>Orchesella villosa</i>	NC_010534	✓	
Arthropoda	<i>Orius niger</i>	NC_012429		
Arthropoda	<i>Ornithoctonus huwena</i>	NC_005925		
Arthropoda	<i>Ornithodoros moubata</i>	NC_004357		
Arthropoda	<i>Ornithodoros porcinus</i>	NC_005820		
Arthropoda	<i>Orussus occidentalis</i>	NC_012689		

Group	Name	Accession	Metazoa-300	Metazoa-100
Arthropoda	<i>Pachypsylla venusta</i>	NC_006157	✓	
Arthropoda	<i>Pagurus longicarpus</i>	NC_003058		
Arthropoda	<i>Panonychus ulmi</i>	NC_012571	✓	
Arthropoda	<i>Panulirus japonicus</i>	NC_004251		
Arthropoda	<i>Paracyclopina nana</i>	NC_012455	✓	
Arthropoda	<i>Parafronurus youi</i>	NC_011359	✓	✓
Arthropoda	<i>Paraplea frontalis</i>	NC_012822		
Arthropoda	<i>Pedetontus silvestrii</i>	NC_011717		
Arthropoda	<i>Penaeus monodon</i>	NC_002184	✓	
Arthropoda	<i>Periplaneta fuliginosa</i>	NC_006076	✓	✓
Arthropoda	<i>Petrobius brevistylis</i>	NC_007688	✓	✓
Arthropoda	<i>Phaenacantha marcida</i>	NC_012460		
Arthropoda	<i>Phalangium opilio</i>	NC_010766	✓	✓
Arthropoda	<i>Philaenus spumarius</i>	NC_005944		
Arthropoda	<i>Phrynus sp. 1 SEM-2008</i>	NC_010775	✓	
Arthropoda	<i>Physopelta gutta</i>	NC_012432		
Arthropoda	<i>Phytoseiulus persimilis</i>	NC_014049	✓	
Arthropoda	<i>Podura aquatica</i>	NC_006075	✓	✓
Arthropoda	<i>Pollicipes mitella</i>	NC_008742	✓	
Arthropoda	<i>Pollicipes polymerus</i>	NC_005936	✓	✓
Arthropoda	<i>Protohermes concolorus</i>	NC_011524	✓	
Arthropoda	<i>Psacotha hilaris</i>	NC_013070		
Arthropoda	<i>Pseudocellus pearsei</i>	NC_009985	✓	✓
Arthropoda	<i>Pteronarcys princeps</i>	NC_006133	✓	✓
Arthropoda	<i>Pyrocoelia rufa</i>	NC_003970		
Arthropoda	<i>Pyrophorus divergens</i>	NC_009964		
Arthropoda	<i>Ramulus hainanense</i>	NC_013185	✓	
Arthropoda	<i>Reticulitermes flavipes</i>	NC_009498	✓	
Arthropoda	<i>Reticulitermes virginicus</i>	NC_009500		
Arthropoda	<i>Rhagophthalmus lufengensis</i>	NC_010969		
Arthropoda	<i>Rhagophthalmus ohbai</i>	NC_010964		
Arthropoda	<i>Rhipicephalus sanguineus</i>	NC_002074	✓	
Arthropoda	<i>Rhopaea magnicornis</i>	NC_013252		
Arthropoda	<i>Rhopalomyia pomum</i>	NC_013063	✓	
Arthropoda	<i>Ruspolia dubia</i>	NC_009876		
Arthropoda	<i>Saldula arsenjevi</i>	NC_012463		
Arthropoda	<i>Schizaphis graminum</i>	NC_006158	✓	
Arthropoda	<i>Sclerophasma paresisense</i>	NC_007701	✓	
Arthropoda	<i>Scutigera coleoptrata</i>	NC_005870	✓	✓
Arthropoda	<i>Scutigera caudata</i>	NC_008453	✓	✓
Arthropoda	<i>Scylla tranquebarica</i>	NC_012567		

Group	Name	Accession	Metazoa-300	Metazoa-100
Arthropoda	<i>Shinkaia crosnieri</i>	NC_011013		
Arthropoda	<i>Sialis hamata</i>	NC_013256	✓	
Arthropoda	<i>Siphonurus immanis</i>	NC_013822		
Arthropoda	<i>Sminthurus viridis</i>	NC_010536	✓	
Arthropoda	<i>Speleonectes tulumensis</i>	NC_005938	✓	✓
Arthropoda	<i>Sphaerius sp. BT0074</i>	NC_011322		
Arthropoda	<i>Squilla empusa</i>	NC_007444	✓	✓
Arthropoda	<i>Squilla mantis</i>	NC_006081	✓	
Arthropoda	<i>Steganacarus magnus</i>	NC_011574	✓	
Arthropoda	<i>Stylochyrus ravior</i>	NC_013474	✓	
Arthropoda	<i>Symphylella sp. YG-2006</i>	NC_011572	✓	
Arthropoda	<i>Tachypleus tridentatus</i>	NC_012574		
Arthropoda	<i>Tamolanica tamolana</i>	NC_007702	✓	
Arthropoda	<i>Teleogryllus emma</i>	NC_011823	✓	
Arthropoda	<i>Tetracrita japonica</i>	NC_008974	✓	
Arthropoda	<i>Tetraleurodes acaciae</i>	NC_006292		
Arthropoda	<i>Tetranychus urticae</i>	NC_010526	✓	
Arthropoda	<i>Tetraphalerus bruchi</i>	NC_011328		
Arthropoda	<i>Tetrodontophora bielanensis</i>	NC_002735	✓	✓
Arthropoda	<i>Thermobia domestica</i>	NC_006080	✓	
Arthropoda	<i>Thrips imaginis</i>	NC_004371	✓	
Arthropoda	<i>Thyropygus sp. DVL-2001</i>	NC_003344	✓	✓
Arthropoda	<i>Tigriopus californicus</i>	NC_008831	✓	✓
Arthropoda	<i>Tigriopus japonicus</i>	NC_003979	✓	✓
Arthropoda	<i>Trachypachus holmbergi</i>	NC_011329		
Arthropoda	<i>Trialeurodes vaporariorum</i>	NC_006280		
Arthropoda	<i>Triatoma dimidiata</i>	NC_002609	✓	
Arthropoda	<i>Tribolium castaneum</i>	NC_003081	✓	
Arthropoda	<i>Tricholepidion gertschi</i>	NC_005437	✓	✓
Arthropoda	<i>Trigoniophthalmus alternatus</i>	NC_010532		
Arthropoda	<i>Triops cancriformis</i>	NC_004465	✓	✓
Arthropoda	<i>Triops longicaudatus</i>	NC_006079	✓	✓
Arthropoda	<i>Unionicola foili</i>	NC_011036	✓	
Arthropoda	<i>Uroctonus mordax</i>	NC_010782	✓	
Arthropoda	<i>Valentia hoffmanni</i>	NC_012823		
Arthropoda	<i>Vanhornia eucnemidarum</i>	NC_008323	✓	
Arthropoda	<i>Vargula hilgendorfii</i>	NC_005306	✓	✓
Arthropoda	<i>Varroa destructor</i>	NC_004454	✓	✓
Arthropoda	<i>Walchia hayashii</i>	NC_010595	✓	
Arthropoda	<i>Yemmalysus parallelus</i>	NC_012464		
Blastocladiomycota	<i>Blastocladiella emersonii</i>	NC_011360	✓	

Group	Name	Accession	Metazoa-300	Metazoa-100
Brachiopoda	<i>Laqueus rubellus</i>	NC_002322	✓	✓
Brachiopoda	<i>Terebratalia transversa</i>	NC_003086	✓	✓
Brachiopoda	<i>Terebratulina retusa</i>	NC_000941	✓	✓
Bryozoa	<i>Bugula neritina</i>	NC_010197	✓	✓
Bryozoa	<i>Flustrellidra hispida</i>	NC_008192	✓	✓
Bryozoa	<i>Watersipora subtorquata</i>	NC_011820	✓	✓
Chaetognatha	<i>Decipisagitta decipiens</i>	NC_013811		
Chaetognatha	<i>Paraspadella gotoi</i>	NC_006083	✓	✓
Chaetognatha	<i>Sagitta enflata</i>	NC_013814	✓	✓
Chaetognatha	<i>Spadella cephaloptera</i>	NC_006386	✓	✓
Chaetognatha	<i>Zonosagitta nagae</i>	NC_013810	✓	✓
Chordata	<i>Abronia graminea</i>	NC_005958		
Chordata	<i>Abudefduf vaigiensis</i>	NC_009064	✓	
Chordata	<i>Acanthogobius hasta</i>	NC_006131		
Chordata	<i>Achalinus meiguensis</i>	NC_011576		
Chordata	<i>Acrochordus granulatus</i>	NC_007400	✓	
Chordata	<i>Alligator mississippiensis</i>	NC_001922	✓	
Chordata	<i>Alloctytus niger</i>	NC_004398	✓	
Chordata	<i>Amolops tormotus</i>	NC_009423		
Chordata	<i>Amphisbaena schmidtii</i>	NC_006284		
Chordata	<i>Andrias japonicus</i>	NC_007446		
Chordata	<i>Anguilla japonica</i>	NC_002707	✓	
Chordata	<i>Anguis fragilis</i>	NC_012431		
Chordata	<i>Anolis carolinensis</i>	NC_010972		
Chordata	<i>Anomalurus sp. GP-2005</i>	NC_009056		
Chordata	<i>Aphredoderus sayanus</i>	NC_004372		
Chordata	<i>Aplidium conicum</i>	NC_013584	✓	
Chordata	<i>Apteronotus albifrons</i>	NC_004692		
Chordata	<i>Ariosoma shiroanago</i>	NC_013632		
Chordata	<i>Aspasma minima</i>	NC_008130		
Chordata	<i>Asymmetron lucayanum</i>	NC_006464	✓	✓
Chordata	<i>Atractosteus spatula</i>	NC_008131		
Chordata	<i>Aulostomus chinensis</i>	NC_010269		
Chordata	<i>Bathygadus antrodes</i>	NC_008222		
Chordata	<i>Beryx splendens</i>	NC_003188		
Chordata	<i>Bipes biporus</i>	NC_006287		
Chordata	<i>Bipes canaliculatus</i>	NC_006288		
Chordata	<i>Blanus cinereus</i>	NC_012433		
Chordata	<i>Boa constrictor</i>	NC_007398		
Chordata	<i>Bradypus tridactylus</i>	NC_006923		
Chordata	<i>Branchiostoma floridae</i>	NC_000834	✓	

Group	Name	Accession	Metazoa-300	Metazoa-100
Chordata	<i>Bregmaceros nectabanus</i>	NC_008124	✓	
Chordata	<i>Buergeria buergeri</i>	NC_008975		
Chordata	<i>Bufo gargarizans</i>	NC_008410	✓	
Chordata	<i>Bufo melanostictus</i>	NC_005794		
Chordata	<i>Caiman crocodilus</i>	NC_002744	✓	
Chordata	<i>Calotes versicolor</i>	NC_009683		
Chordata	<i>Capros aper</i>	NC_010958		
Chordata	<i>Carapus bermudensis</i>	NC_004373		
Chordata	<i>Carettochelys insculpta</i>	NC_014048		
Chordata	<i>Caulophryne pelagica</i>	NC_004383		
Chordata	<i>Cavia porcellus</i>	NC_000884		
Chordata	<i>Cebus albifrons</i>	NC_002763	✓	
Chordata	<i>Ceratias uranoscopus</i>	NC_013882		
Chordata	<i>Chaunax abei</i>	NC_004381		
Chordata	<i>Chaunax tosaensis</i>	NC_004382		
Chordata	<i>Chelonia mydas</i>	NC_000886	✓	
Chordata	<i>Chimaera monstrosa</i>	NC_003136		
Chordata	<i>Chionodraco myersi</i>	NC_010689		
Chordata	<i>Chlamydosaurus kingii</i>	NC_009421		
Chordata	<i>Chrysochloris asiatica</i>	NC_004920		
Chordata	<i>Ciona intestinalis</i>	NC_004447	✓	✓
Chordata	<i>Ciona savignyi</i>	NC_004570	✓	
Chordata	<i>Clavelina lepadiformis</i>	NC_012887	✓	✓
Chordata	<i>Coelophrys brevicaudata</i>	NC_013886		
Chordata	<i>Coelorinchus kishinouyei</i>	NC_003169		
Chordata	<i>Coleonyx variegatus</i>	NC_008774		
Chordata	<i>Cordylus warreni</i>	NC_005962		
Chordata	<i>Crenimugil crenilabis</i>	NC_003170		
Chordata	<i>Cricetulus griseus</i>	NC_007936		
Chordata	<i>Cryptopsaras couesii</i>	NC_013880	✓	
Chordata	<i>Cyema atrum</i>	NC_013609		
Chordata	<i>Cynoglossus semilaevis</i>	NC_012825		
Chordata	<i>Daboia russellii</i>	NC_011391		
Chordata	<i>Dasypus novemcinctus</i>	NC_001821		
Chordata	<i>Dendrohyrax dorsalis</i>	NC_010301		
Chordata	<i>Diplometopon zarudnyi</i>	NC_006283		
Chordata	<i>Diplosoma listerianum</i>	NC_013556	✓	
Chordata	<i>Dirtemoides veriginiae</i>	NC_008126		
Chordata	<i>Doliolum nationalis</i>	NC_006627		
Chordata	<i>Echinops telfairi</i>	NC_002631		
Chordata	<i>Echinosorex gymnura</i>	NC_002808		

Group	Name	Accession	Metazoa-300	Metazoa-100
Chordata	<i>Elassoma evergladei</i>	NC_003175		
Chordata	<i>Elephas maximus</i>	NC_005129		
Chordata	<i>Ensatina eschscholtzii</i>	NC_006328		
Chordata	<i>Epigonichthys maldivensis</i>	NC_006465	✓	✓
Chordata	<i>Eptatretus burgeri</i>	NC_002807	✓	
Chordata	<i>Eremias brenchleyi</i>	NC_011764		
Chordata	<i>Erinaceus europaeus</i>	NC_002080		
Chordata	<i>Erpetoichthys calabaricus</i>	NC_005251	✓	
Chordata	<i>Ethmalosa fimbriata</i>	NC_009582		
Chordata	<i>Eurypegasus draconis</i>	NC_010264	✓	
Chordata	<i>Eurypharynx pelecانoides</i>	NC_005299		
Chordata	<i>Fejervarya cancrivora</i>	NC_012647	✓	
Chordata	<i>Fejervarya limnocharis</i>	NC_005055		
Chordata	<i>Furcifer oustaleti</i>	NC_008777	✓	
Chordata	<i>Gambusia affinis</i>	NC_004388		
Chordata	<i>Gavialis gangeticus</i>	NC_008241		
Chordata	<i>Gegeneophis ramaswamii</i>	NC_006301		
Chordata	<i>Gekko gekko</i>	NC_007627		
Chordata	<i>Gekko vittatus</i>	NC_008772		
Chordata	<i>Geocalamus acutus</i>	NC_006285		
Chordata	<i>Glis glis</i>	NC_001892		
Chordata	<i>Gonorynchus abbreviatus</i>	NC_011018		
Chordata	<i>Gyrinocheilus aymonieri</i>	NC_008672	✓	
Chordata	<i>Halichoeres melanurus</i>	NC_009066		
Chordata	<i>Halocynthia roretzi</i>	NC_002177	✓	
Chordata	<i>Haplophryne mollis</i>	NC_013865		
Chordata	<i>Heloderma suspectum</i>	NC_008776		
Chordata	<i>Hemidactylus frenatus</i>	NC_012902		
Chordata	<i>Hemiechinus auritus</i>	NC_005033		
Chordata	<i>Hemiphaga novaeseelandiae</i>	NC_013244		
Chordata	<i>Herdmania momus</i>	NC_013561	✓	✓
Chordata	<i>Heteronotia binoei</i>	NC_010292		
Chordata	<i>Himantolophus groenlandicus</i>	NC_013868		
Chordata	<i>Hylomys suillus</i>	NC_010298		
Chordata	<i>Hynobius yangi</i>	NC_013825	✓	
Chordata	<i>Ichthyophis bannanicus</i>	NC_006404		
Chordata	<i>Iguana iguana</i>	NC_002793		
Chordata	<i>Indostomus paradoxus</i>	NC_004401		
Chordata	<i>Jaculus jaculus</i>	NC_005314		
Chordata	<i>Kaloula pulchra</i>	NC_006405		
Chordata	<i>Kinyongia fischeri</i>	NC_012465		

Group	Name	Accession	Metazoa-300	Metazoa-100
Chordata	<i>Kryptolebias marmoratus</i>	NC_003290		
Chordata	<i>Labracinus cyclophthalmus</i>	NC_009054		
Chordata	<i>Lagostrophus fasciatus</i>	NC_008447		
Chordata	<i>Lampetra fluviatilis</i>	NC_001131	✓	
Chordata	<i>Lampris guttatus</i>	NC_003165		
Chordata	<i>Latimeria chalumnae</i>	NC_001804		
Chordata	<i>Latimeria menadoensis</i>	NC_006921		
Chordata	<i>Lepidochelys olivacea</i>	NC_011516		
Chordata	<i>Lepidophyma flavimaculatum</i>	NC_008775		
Chordata	<i>Lepidosiren paradoxa</i>	NC_003342	✓	
Chordata	<i>Limnonectes fujianensis</i>	NC_007440		
Chordata	<i>Lissemys punctata</i>	NC_012414		
Chordata	<i>Lophius americanus</i>	NC_004380		
Chordata	<i>Lophius litulon</i>	NC_008125		
Chordata	<i>Lota lota</i>	NC_004379		
Chordata	<i>Loxodonta africana</i>	NC_000934		
Chordata	<i>Macaca sylvanus</i>	NC_002764		
Chordata	<i>Macroramphosus scolopax</i>	NC_010265		
Chordata	<i>Macroscelides proboscideus</i>	NC_004026		
Chordata	<i>Mantella madagascariensis</i>	NC_007888		
Chordata	<i>Mastacembelus favus</i>	NC_003193		
Chordata	<i>Microcosmus sulcatus</i>	NC_013752		
Chordata	<i>Microhyla heymonsi</i>	NC_006406		
Chordata	<i>Monodactylus argenteus</i>	NC_009858		
Chordata	<i>Monognathus jespersenii</i>	NC_013612	✓	
Chordata	<i>Monopterus albus</i>	NC_003192		
Chordata	<i>Muntiacus reevesi micrurus</i>	NC_008491		
Chordata	<i>Muraenesox bagio</i>	NC_013614		
Chordata	<i>Myxine glutinosa</i>	NC_002639	✓	
Chordata	<i>Narcetes erimelas</i>	NC_011008		
Chordata	<i>Neoceratodus forsteri</i>	NC_003127		
Chordata	<i>Nothobranchius furzeri</i>	NC_011814		
Chordata	<i>Ophiophagus hannah</i>	NC_011394		
Chordata	<i>Ornithorhynchus anatinus</i>	NC_000891		
Chordata	<i>Oryctolagus cuniculus</i>	NC_001913		
Chordata	<i>Osteolaemus tetraspis</i>	NC_009728		
Chordata	<i>Paa spinosa</i>	NC_013270		
Chordata	<i>Parazen pacificus</i>	NC_004396		
Chordata	<i>Pelobates cultripes</i>	NC_008144	✓	
Chordata	<i>Pelomedusa subrufa</i>	NC_001947	✓	
Chordata	<i>Percopsis transmontana</i>	NC_003168		

Group	Name	Accession	Metazoa-300	Metazoa-100
Chordata	<i>Petromyzon marinus</i>	NC_001626	✓	
Chordata	<i>Petroscirtes breviceps</i>	NC_004411	✓	
Chordata	<i>Phaeognathus hubrichti</i>	NC_006344		
Chordata	<i>Phallusia fumigata</i>	NC_009834	✓	✓
Chordata	<i>Phallusia mammilata</i>	NC_009833		
Chordata	<i>Phascolarctos cinereus</i>	NC_008133		
Chordata	<i>Physiculus japonicus</i>	NC_004377		
Chordata	<i>Platanista minor</i>	NC_005275		
Chordata	<i>Plesiobatis daviesi</i>	NC_007230		
Chordata	<i>Plestiodon egregius</i>	NC_000888	✓	
Chordata	<i>Plethodon cinereus</i>	NC_006343	✓	
Chordata	<i>Plethodon petraeus</i>	NC_006334		
Chordata	<i>Podarcis siculus</i>	NC_011609		
Chordata	<i>Pogona vitticeps</i>	NC_006922		
Chordata	<i>Polymixia lowei</i>	NC_003181	✓	
Chordata	<i>Polypedates megacephalus</i>	NC_006408		
Chordata	<i>Polypterus senegalus senegalus</i>	NC_004418	✓	
Chordata	<i>Porichthys myriaster</i>	NC_006920	✓	
Chordata	<i>Procavia capensis</i>	NC_004919		
Chordata	<i>Protopterus dolloi</i>	NC_001708		
Chordata	<i>Psetta maxima</i>	NC_013183		
Chordata	<i>Pseudalutarius nasicornis</i>	NC_011955		
Chordata	<i>Pseudolabrus sieboldi</i>	NC_009067		
Chordata	<i>Pseudotrapelus sinaitus</i>	NC_013603	✓	
Chordata	<i>Pterothrissus gissu</i>	NC_005796	✓	
Chordata	<i>Python regius</i>	NC_007399		
Chordata	<i>Rachycentron canadum</i>	NC_011219		
Chordata	<i>Raiamas senegalensis</i>	NC_013764	✓	
Chordata	<i>Ramphotyphlops braminus</i>	NC_010196	✓	
Chordata	<i>Rana nigromaculata</i>	NC_002805		
Chordata	<i>Rattus norvegicus</i>	NC_001665		
Chordata	<i>Rena humilis</i>	NC_005961		
Chordata	<i>Rhacophorus schlegelii</i>	NC_007178		
Chordata	<i>Rhinatrema bivittatum</i>	NC_006303		
Chordata	<i>Rhinecanthus aculeatus</i>	NC_011941		
Chordata	<i>Rhineura floridana</i>	NC_006282		
Chordata	<i>Rhyacichthys aspro</i>	NC_004414	✓	
Chordata	<i>Rhyacotriton variegatus</i>	NC_006331		
Chordata	<i>Saccopharynx lavenbergi</i>	NC_005298		
Chordata	<i>Saimiri sciureus</i>	NC_012775		
Chordata	<i>Salarias fasciatus</i>	NC_004412		

Group	Name	Accession	Metazoa-300	Metazoa-100
Chordata	<i>Scolecormorphus vittatus</i>	NC_006304		
Chordata	<i>Shinisaurus crocodilurus</i>	NC_005959		
Chordata	<i>Sigmops gracilis</i>	NC_002574	✓	
Chordata	<i>Siphonops annulatus</i>	NC_007911		
Chordata	<i>Sirembo imberbis</i>	NC_008123		
Chordata	<i>Smithornis sharpei</i>	NC_000879		
Chordata	<i>Solea senegalensis</i>	NC_008327		
Chordata	<i>Solenostomus cyanopterus</i>	NC_010267		
Chordata	<i>Sphenodon punctatus</i>	NC_004815	✓	
Chordata	<i>Squalogadus modificatus</i>	NC_008223		
Chordata	<i>Squalus acanthias</i>	NC_002012	✓	
Chordata	<i>Styela plicata</i>	NC_013565	✓	
Chordata	<i>Symphalangus syndactylus</i>	NC_014047		
Chordata	<i>Synodus variegatus</i>	NC_007228	✓	
Chordata	<i>Tachyglossus aculeatus</i>	NC_003321		
Chordata	<i>Tarentola mauritanica</i>	NC_012366		
Chordata	<i>Teratoscincus keyserlingii</i>	NC_007008		
Chordata	<i>Tetrabrachium ocellatum</i>	NC_013879		
Chordata	<i>Thryonomys swinderianus</i>	NC_002658		
Chordata	<i>Thymallus arcticus</i>	NC_012929	✓	
Chordata	<i>Triacanthus biaculeatus</i>	NC_009863		
Chordata	<i>Trichiurus japonicus</i>	NC_011719		
Chordata	<i>Trionyx triunguis</i>	NC_012833		
Chordata	<i>Trizipichthys weberi</i>	NC_009862		
Chordata	<i>Tropidophis haetianus</i>	NC_012573		
Chordata	<i>Typhlonectes natans</i>	NC_002471		
Chordata	<i>Typhlops reticulatus</i>	NC_010971		
Chordata	<i>Uraeotyphlus cf. oxyurus MW-212</i>	NC_006305		
Chordata	<i>Varanus niloticus</i>	NC_008778		
Chordata	<i>Varanus salvator</i>	NC_010974		
Chordata	<i>Ventrifossa garmani</i>	NC_008225		
Chordata	<i>Xenagama taylori</i>	NC_008065		
Chordata	<i>Xenopus (Silurana) tropicalis</i>	NC_006839	✓	
Chordata	<i>Zu cristatus</i>	NC_003167		
Chytridiomycota	<i>Harpochytrium sp. JEL94</i>	NC_004760	✓	
Chytridiomycota	<i>Hyaloraphidium curvatum</i>	NC_003048		
Chytridiomycota	<i>Monoblepharella sp. JEL15</i>	NC_004624	✓	
Chytridiomycota	<i>Rhizophyidium sp. 136</i>	NC_003053	✓	
Chytridiomycota	<i>Spizellomyces punctatus</i>	NC_003052	✓	
Cnidaria	<i>Acanella eburnea</i>	NC_011016	✓	
Cnidaria	<i>Acropora tenuis</i>	NC_003522	✓	

Group	Name	Accession	Metazoa-300	Metazoa-100
Cnidaria	<i>Agaricia humilis</i>	NC_008160		
Cnidaria	<i>Astrangia</i> sp. JVK-2006	NC_008161	✓	
Cnidaria	<i>Aurelia aurita</i>	NC_008446		
Cnidaria	<i>Briareum asbestinum</i>	NC_008073	✓	✓
Cnidaria	<i>Chrysopathes formosa</i>	NC_008411	✓	
Cnidaria	<i>Dendronephthya gigantea</i>	NC_013573	✓	✓
Cnidaria	<i>Discosoma</i> sp. CASIZ 168915	NC_008071	✓	✓
Cnidaria	<i>Hydra oligactis</i>	NC_010214	✓	
Cnidaria	<i>Madracis mirabilis</i>	NC_011160		
Cnidaria	<i>Metridium senile</i>	NC_000933	✓	
Cnidaria	<i>Nematostella</i> sp. JVK-2006	NC_008164	✓	✓
Cnidaria	<i>Pocillopora damicornis</i>	NC_009797	✓	
Cnidaria	<i>Porites porites</i>	NC_008166	✓	
Cnidaria	<i>Pseudopterogorgia bipinnata</i>	NC_008157	✓	✓
Cnidaria	<i>Ricordea florida</i>	NC_008159	✓	
Cnidaria	<i>Savalia savaglia</i>	NC_008827	✓	✓
Codonosigidae	<i>Monosiga brevicollis</i> ATCC 50154	NC_004309	✓	✓
Dikarya	<i>Cryptococcus neoformans</i> var. <i>grubii</i>	NC_004336		
Dikarya	<i>Lecanicillium muscarium</i>	NC_004514	✓	
Dikarya	<i>Moniliophthora perniciosa</i>	NC_005927		
Dikarya	<i>Penicillium marneffeii</i>	NC_005256	✓	
Dikarya	<i>Pneumocystis carinii</i>	NC_013660	✓	
Dikarya	<i>Saccharomyces cerevisiae</i>	NC_001224		
Dikarya	<i>Schizosaccharomyces pombe</i>	NC_001326	✓	
Dikarya	<i>Ustilago maydis</i>	NC_008368		
Echinodermata	<i>Acanthaster planci</i>	NC_007788		
Echinodermata	<i>Amphipholis squamata</i>	NC_013876		
Echinodermata	<i>Asterias amurensis</i>	NC_006665		
Echinodermata	<i>Astropecten polyacanthus</i>	NC_006666		
Echinodermata	<i>Astrospartus mediterraneus</i>	NC_013878		
Echinodermata	<i>Cucumaria miniata</i>	NC_005929	✓	✓
Echinodermata	<i>Echinocardium cordatum</i>	NC_013881	✓	✓
Echinodermata	<i>Florometra serratissima</i>	NC_001878		
Echinodermata	<i>Holothuria forskali</i>	NC_013884		
Echinodermata	<i>Neogymnocrinus richeri</i>	NC_007689	✓	✓
Echinodermata	<i>Ophiocomina nigra</i>	NC_013874		
Echinodermata	<i>Ophiopholis aculeata</i>	NC_005334	✓	
Echinodermata	<i>Ophiura albida</i>	NC_010691	✓	✓
Echinodermata	<i>Ophiura lutkeni</i>	NC_005930		
Echinodermata	<i>Phanogenia gracilis</i>	NC_007690		
Echinodermata	<i>Pisaster ochraceus</i>	NC_004610	✓	✓

Group	Name	Accession	Metazoa-300	Metazoa-100
Echinodermata	<i>Strongylocentrotus purpuratus</i>	NC_001453		
Echiura	<i>Urechis caupo</i>	NC_006379	✓	✓
Echiura	<i>Urechis unicinctus</i>	NC_012768		
Entoprocta	<i>Loxocorone allax</i>	NC_010431	✓	✓
Entoprocta	<i>Loxosomella aloxiata</i>	NC_010432	✓	✓
Fungi	<i>Mortierella verticillata</i>	NC_006838		
Fungi	<i>Rhizopus oryzae</i>	NC_006836		
Fungi	<i>Smittium culisetae</i>	NC_006837	✓	
Glomeromycota	<i>Glomus intraradices</i>	NC_012056	✓	
Hemichordata	<i>Balanoglossus carnosus</i>	NC_001887	✓	
Hemichordata	<i>Balanoglossus clavigerus</i>	NC_013877	✓	✓
Hemichordata	<i>Saccoglossus kowalevskii</i>	NC_007438	✓	✓
Mollusca	<i>Acanthocardia tuberculata</i>	NC_008452	✓	
Mollusca	<i>Albinaria caerulea</i>	NC_001761		
Mollusca	<i>Aplysia californica</i>	NC_005827		
Mollusca	<i>Argopecten irradians irradians</i>	NC_012977		
Mollusca	<i>Argopecten irradians</i>	NC_009687	✓	
Mollusca	<i>Ascobulla fragilis</i>	NC_012428		
Mollusca	<i>Biomphalaria glabrata</i>	NC_005439		
Mollusca	<i>Biomphalaria tenagophila</i>	NC_010220		
Mollusca	<i>Bolinus brandaris</i>	NC_013250		
Mollusca	<i>Cepaea nemoralis</i>	NC_001816	✓	
Mollusca	<i>Chaetoderma nitidulum</i>	NC_013846	✓	
Mollusca	<i>Conus borgesii</i>	NC_013243		
Mollusca	<i>Crassostrea iredalei</i>	NC_013997		
Mollusca	<i>Crassostrea sikamea</i>	NC_012649	✓	
Mollusca	<i>Crassostrea virginica</i>	NC_007175		
Mollusca	<i>Cristaria plicata</i>	NC_012716	✓	
Mollusca	<i>Cymbium olla</i>	NC_013245		
Mollusca	<i>Elysia chlorotica</i>	NC_010567		
Mollusca	<i>Graptacme eborea</i>	NC_006162	✓	
Mollusca	<i>Haliotis rubra</i>	NC_005940	✓	✓
Mollusca	<i>Haliotis tuberculata tuberculata</i>	NC_013708		
Mollusca	<i>Hiatella arctica</i>	NC_008451	✓	
Mollusca	<i>Katharina tunicata</i>	NC_001636	✓	✓
Mollusca	<i>Lampsilis ornata</i>	NC_005335		
Mollusca	<i>Loligo bleekeri</i>	NC_002507	✓	
Mollusca	<i>Loripes lacteus</i>	NC_013271	✓	
Mollusca	<i>Lottia digitalis</i>	NC_007782	✓	
Mollusca	<i>Lucinella divaricata</i>	NC_013275	✓	
Mollusca	<i>Meretrix meretrix</i>	NC_013188		

Group	Name	Accession	Metazoa-300	Metazoa-100
Mollusca	<i>Meretrix petechialis</i>	NC_012767	✓	
Mollusca	<i>Mimachlamys nobilis</i>	NC_011608	✓	
Mollusca	<i>Mizuhopecten yessoensis</i>	NC_009081		
Mollusca	<i>Myosotella myosotis</i>	NC_012434		
Mollusca	<i>Mytilus edulis</i>	NC_006161		
Mollusca	<i>Mytilus trossulus</i>	NC_007687	✓	
Mollusca	<i>Nautilus macromphalus</i>	NC_007980	✓	✓
Mollusca	<i>Octopus ocellatus</i>	NC_007896		
Mollusca	<i>Octopus vulgaris</i>	NC_006353		
Mollusca	<i>Onchidella celtica</i>	NC_012376		
Mollusca	<i>Placopecten magellanicus</i>	NC_007234		
Mollusca	<i>Platevindex mortoni</i>	NC_013934		
Mollusca	<i>Pupa strigosa</i>	NC_002176		
Mollusca	<i>Pyramidella dolabrata</i>	NC_012435		
Mollusca	<i>Roboastra europaea</i>	NC_004321	✓	
Mollusca	<i>Saccostrea mordax</i>	NC_013998		
Mollusca	<i>Sinonovacula constricta</i>	NC_011075	✓	
Mollusca	<i>Siphonaria pectinata</i>	NC_012383		
Mollusca	<i>Siphonodentalium lobatum</i>	NC_005840	✓	
Mollusca	<i>Todarodes pacificus</i>	NC_006354		
Mollusca	<i>Vampyroteuthis infernalis</i>	NC_009689		
Mollusca	<i>Venerupis philippinarum</i>	NC_003354	✓	
Mollusca	<i>Venustaconcha ellipsiformis</i>	NC_013659	✓	
Nematoda	<i>Agamermis sp. BH-2006</i>	NC_008231	✓	
Nematoda	<i>Angiostrongylus cantonensis</i>	NC_013065		
Nematoda	<i>Angiostrongylus costaricensis</i>	NC_013067		
Nematoda	<i>Anisakis simplex</i>	NC_007934		
Nematoda	<i>Caenorhabditis briggsae</i>	NC_009885		
Nematoda	<i>Dirofilaria immitis</i>	NC_005305	✓	
Nematoda	<i>Enterobius vermicularis</i>	NC_011300	✓	
Nematoda	<i>Haemonchus contortus</i>	NC_010383		
Nematoda	<i>Heterorhabditis bacteriophora</i>	NC_008534	✓	
Nematoda	<i>Hexamermis agrotis</i>	NC_008828		
Nematoda	<i>Metastrongylus pudendotectus</i>	NC_013813		
Nematoda	<i>Metastrongylus salmi</i>	NC_013815		
Nematoda	<i>Onchocerca volvulus</i>	NC_001861	✓	
Nematoda	<i>Radopholus similis</i>	NC_013253	✓	
Nematoda	<i>Romanomermis culicivorax</i>	NC_008640	✓	
Nematoda	<i>Romanomermis iyengari</i>	NC_008693	✓	
Nematoda	<i>Romanomermis nielsenii</i>	NC_008692		
Nematoda	<i>Strelkovimermis spiculatus</i>	NC_008047	✓	

Group	Name	Accession	Metazoa-300	Metazoa-100
Nematoda	<i>Thaumamermis cosgrovei</i>	NC_008046	✓	
Nematoda	<i>Toxocara malaysiensis</i>	NC_010527		
Nematoda	<i>Trichinella spiralis</i>	NC_002681	✓	
Nematoda	<i>Trichostrongylus vitrinus</i>	NC_013807		
Nematoda	<i>Xiphinema americanum</i>	NC_005928	✓	
Nemertea	<i>Cephalothrix simula</i>	NC_012821	✓	
Nemertea	<i>Lineus viridis</i>	NC_012889	✓	✓
Onychophora	<i>Epiperipatus biolleyi</i>	NC_009082	✓	✓
Onychophora	<i>Metaperipatus inae</i>	NC_010961	✓	✓
Placozoa	<i>Placozoon sp. BZ10101</i>	NC_008832	✓	✓
Placozoa	<i>Placozoon sp. BZ2423</i>	NC_008834	✓	✓
Placozoa	<i>Placozoon sp. BZ49</i>	NC_008833	✓	✓
Placozoa	<i>Trichoplax adhaerens</i>	NC_008151	✓	✓
Platyhelminthes	<i>Clonorchis sinensis</i>	NC_012147		
Platyhelminthes	<i>Diphyllbothrium nihonkaiense</i>	NC_009463		
Platyhelminthes	<i>Echinococcus shiquicus</i>	NC_009460		
Platyhelminthes	<i>Echinococcus vogeli</i>	NC_009462		
Platyhelminthes	<i>Fasciola hepatica</i>	NC_002546		
Platyhelminthes	<i>Gyrodactylus derjavinoideus</i>	NC_010976	✓	
Platyhelminthes	<i>Gyrodactylus thymalli</i>	NC_009682	✓	
Platyhelminthes	<i>Hymenolepis diminuta</i>	NC_002767		
Platyhelminthes	<i>Microcotyle sebastis</i>	NC_009055	✓	
Platyhelminthes	<i>Opisthorchis felineus</i>	NC_011127	✓	
Platyhelminthes	<i>Paragonimus westermani</i>	NC_002354	✓	
Platyhelminthes	<i>Schistosoma haematobium</i>	NC_008074		
Platyhelminthes	<i>Schistosoma japonicum</i>	NC_002544	✓	
Platyhelminthes	<i>Schistosoma mansoni</i>	NC_002545	✓	
Platyhelminthes	<i>Schistosoma mekongi</i>	NC_002529		
Platyhelminthes	<i>Schistosoma spindale</i>	NC_008067		
Platyhelminthes	<i>Spirometra erinaceieuropaei</i>	NC_011037	✓	
Platyhelminthes	<i>Taenia crassiceps</i>	NC_002547		
Platyhelminthes	<i>Taenia solium</i>	NC_004022	✓	
Platyhelminthes	<i>Trichobilharzia regenti</i>	NC_009680		
Porifera	<i>Amphimedon compressa</i>	NC_010201	✓	
Porifera	<i>Amphimedon queenslandica</i>	NC_008944		
Porifera	<i>Aphrocallistes vastus</i>	NC_010769	✓	
Porifera	<i>Aplysina fulva</i>	NC_010203	✓	
Porifera	<i>Axinella corrugata</i>	NC_006894	✓	
Porifera	<i>Chondrilla aff. nucula CHOND</i>	NC_010208	✓	✓
Porifera	<i>Cinachyrella kuekenthali</i>	NC_010198	✓	
Porifera	<i>Geodia neptuni</i>	NC_006990	✓	✓

Group	Name	Accession	Metazoa-300	Metazoa-100
Porifera	<i>Hippospongia lachne</i>	NC_010215	✓	
Porifera	<i>Igernella notabilis</i>	NC_010216		
Porifera	<i>Ircinia strobilina</i>	NC_013662	✓	
Porifera	<i>Oscarella carmela</i>	NC_009090	✓	
Porifera	<i>Topsentia ophiraphidites</i>	NC_010204	✓	
Porifera	<i>Vaceletia sp. GW948</i>	NC_010218	✓	
Porifera	<i>Xestospongia muta</i>	NC_010211	✓	✓
Priapulida	<i>Priapulius caudatus</i>	NC_008557	✓	✓
Rotifera	<i>Rotaria rotatoria</i>	NC_013568	✓	✓
Sipuncula	<i>Phascolosoma esculenta</i>	NC_012618		
Sipuncula	<i>Sipunculus nudus</i>	NC_011826	✓	✓
Xenoturbellida	<i>Xenoturbella bocki</i>	NC_008556	✓	✓
Arthropoda	<i>Pycnogonum litorale</i>	AA	✓	✓
Arthropoda	<i>Euphausia superba</i>	AB	✓	✓
Arthropoda	marbled crayfish	AD	✓	✓
Arthropoda	<i>Hypsibius dujardini</i>	HYPDUJMIT	✓	✓
Arthropoda	<i>Acerentomon franzi</i>	JA	✓	✓
Arthropoda	<i>Cordulia aenea</i>	JB	✓	✓
Arthropoda	<i>Hypsibius dujardini</i>	NC_014848		
Arthropoda	<i>ON Peripatoides</i>		✓	✓
Blastocladiomycota	<i>Allomyces macrogynus</i>		✓	✓
Blastocladiomycota	<i>Blastocladiella emersonii</i>		✓	✓
Brachiopoda	<i>Phoronopsis harmeri</i>	PHHA	✓	✓
Cnidaria	<i>Hydra magnipapillata</i>	NC_011220.011221		
Codonosigide	<i>Monosiga brevicolis</i>		✓	✓
Fungi	<i>Rhizopus stolonifer</i>		✓	✓
Ichthyosporea	<i>Amoebidium parasiticum</i>		✓	✓
Ichthyosporea	<i>Capsaspora owczarzaki</i>		✓	✓
Ministeria	<i>Ministeria vibrans</i>		✓	✓
Nuclearia	<i>Nuclearia simplex</i>		✓	✓
Platyhelminthes	<i>Symsagittifera roscoffensis</i>	NC_014578		
Porifera	<i>Oscarella microlobata</i>	NC_014850		
Porifera	<i>Plakortis simplex</i>	NC_014868		
Rotifera	<i>Brachionus plicatilis</i>	NC_010472.010484	✓	✓
Tardigrada	<i>Macrobiotus hufelandi</i>	AC	✓	✓
Tardigrada	<i>TA Thulinia sp</i>	TA_Hipsibius	✓	✓

## Supplement 4

Detailed description of the other data sets that have been created for a detailed discussion in the other chapters of the special issue.

### Arthropoda

Contains all Arthropoda excluding the Neoptera. As outgroup taxa the Priapulid *Priapulius caudatus* and the two Onychophora *Epiperipatus biolleyi* and *Metaperipatus inae* have been used. Additionally the species for which sequences were contributed by O. Rota-Stabelli, A. Braband, and J. Dambach are included (see Supplement 3 – Additional metazoan sequences).

### Deuterostomia

Contains all Deuterostomia excluding the five Chaetognatha species included in RefSeq 41. As outgroup serve three short branched Protostomia species: the Gastropod *Ilyanassa obsoleta* (NC\_007781), the Annelid *Nephtys sp. 'San Juan Island' YV-2008* (NC\_010559), and the Crustacean *Triops longicaudatus* (NC\_006079).

### Diploblasts-old

Includes all Diploblasts in RefSeq 41 (35 Cnidaria, 27 Porifera, and 4 Placozoa) and the following three additional Placozoa species:

Accession	Name
AB538868	<i>Placozoon sp. 'Shirahama'</i>
EF537576	<i>Iphiteon panicea</i>
EF537577	<i>Sympagella nux mitochondrion</i>

Additionally, one species of each of the metazoan phyla Annelida, Arthropoda, Chordata, Priapulida, Hemichordata, and Echinodermata is included:

Accession	Name
NC_000931	<i>Platynereis dumerilii</i>
NC_003057	<i>Limulus polyphemus</i>
NC_001131	<i>Lampetra fluviatilis</i>
NC_008557	<i>Priapulius caudatus</i>
NC_001887	<i>Balanoglossus carnosus</i>
NC_006665	<i>Asterias amurensis</i>

As outgroup served seven of the species listed in Supplement 3 – “Additional outgroup species”. That is four of the species for which sequences were contributed by F. Lang, i.e., *Amoebidium parasiticum*, *Capsaspora owczarzaki*, *Ministeria vibrans*, and *Nuclearia simplex*, plus five of the fungi, i.e., *Ustilago maydis* (NC\_008368), *Spizellomyces punctatus* (NC\_003052), *Monosiga brevicollis* (NC\_004309), *Rhizopus oryzae* (NC\_006836), and *Allomyces macrogynus* (NC\_001715).

### Diploblasts-old-Deuterostomia

Diploblasts-old without Deuterostomia.

## Diploblasts

This data set includes many additional sequences of basal Metazoa that have been added to RefSeq or GenBank recently. These are 14 Porifera, 46 Cnidaria, and 2 Ctenophora. A complete list of the added species can be found in Table 1. Furthermore the same six bilaterian species that have been used in the Diploblasts-old data set are included. But, a reduced outgroup consisting of *Monosiga brevicollis* (NC\_004309), *Capsaspora owczarzaki*, *Amoebidium parasiticum*, *Nuclearia simplex*, and *Ministeria vibrans* was used.

Cnidaria: Anthozoa	
AF063191,AF064823	<i>Sarcophyton glaucum</i>
GU047877	<i>Dendronephthya castanea</i>
GU047878	<i>Dendronephthya suensoni</i>
GU047879	<i>Scleronephthya gracillimum</i>
GU047880	<i>Calicogorgia granulosa</i>
HQ694725	<i>Dendronephthya mollis</i>
HQ694726	<i>Dendronephthya putterii</i>
HQ694727	<i>Echinogorgia complexa</i>
HQ694728	<i>Euplexaura crassa</i>
NC_015143	<i>Lophelia pertusa</i>
NC_015405	<i>Paracorallium japonicum</i>
NC_015406	<i>Corallium konojoi</i>
NC_015640	<i>Fungiacyathus stephanus</i>
NC_015641	<i>Euphyllia ancora</i>
NC_015642	<i>Polycyathus sp. MFL-2011</i>
NC_015643	<i>Goniopora columna</i>
NC_015644	<i>Porites okinawensis</i>
NC_015644	<i>Porites okinawensis</i>
Cnidaria: Cubozoa	
JN642329, JN642331,	<i>Alatina moseri</i> A
JN642333, JN642335,	
JN642337, JN642339,	
JN642341, JN642343	
JN642330, JN642332,	<i>Alatina moseri</i> B
JN642334, JN642336,	
JN642338, JN642340,	
JN642342, JN642344	
JN700951-JN700951	<i>Alatina moseri</i>
JN700959-JN700962	<i>Carukia barnesi</i>
JN700963-JN700968	<i>Chironex fleckeri</i>
JN700969-JN700974	<i>Chiropsalmus quadrumanus</i>
JN700977-JN700983	<i>Carybdea xaymacana</i>
Cnidaria: Scyphozoa	
HQ694730	<i>Chrysaora quinquecirrha</i>
JN700934	<i>Cassiopea andromeda</i>
JN700937	<i>Cyanea capillata</i>
JN700938	<i>Ectopleura larynx</i>
JN700939	<i>Linuche unguiculata</i>
JN700940	<i>Catostylus mosaicus</i>
JN700941	<i>Chrysaora sp. EK-2011</i>

JN700944	<i>Haliclystus sanjuanensis</i>
JN700946	<i>Lucernaria janetae</i>
JN700949	<i>Pelagia noctiluca</i>
JN700975, JN700976	<i>Craterolophus convolvulus</i>
JN700986	<i>Periphylla periphylla</i>
NC_016466	<i>Cassiopea frondosa</i>
Cnidaria: Hydrozoa	
JN700943	<i>Millepora sp. EK-2011</i>
JN700947	<i>Nemopsis bachei</i>
JN700948	<i>Obelia longissima</i>
JN700950	<i>Pennaria disticha</i>
JN700988	<i>Rhizostoma pulmo</i>
NC_016463	<i>Laomedea flexuosa</i>
NC_016465	<i>Clava multicornis</i>
NC_016467	<i>Cubaia aphrodite</i>
Porifera	
NC_014852	<i>Plakina trilopha</i>
NC_014853	<i>Pseudocorticium jarrei</i>
NC_014856	<i>Oscarella viridis</i>
NC_014857	<i>Plakortis halichondrioides</i>
NC_014860	<i>Plakina jani</i>
NC_014863	<i>Oscarella lobularis</i>
NC_014872	<i>Corticium candelabrum</i>
NC_014876	<i>Halisarca sp. DVL-2010</i>
NC_014884	<i>Plakina monolopha</i>
NC_014885	<i>Plakina crypta</i>
NC_014886	<i>Oscarella malakhovi</i>
NC_014888	<i>Oscarella tuberculata</i>
NC_014892	<i>Plakina sp. DVL-2010</i>
NC_016431	<i>Eunapius subterraneus</i>
Ctenophora	
JN392469	<i>Pleurobrachia bachei</i>
NC_016117	<i>Mnemiopsis leidyi</i>

Table 1: Additional sequences used in the **Diploblasts** data set

## Hexapoda

Contains all Hexapoda, the two species for which sequences were contributed by J. Dambach (Supplement 3 – “Additional metazoan sequences”), and the eight additional Hexapoda species:

Accession	Name
NC_014493	<i>Euphaea formosa</i>
NC_014673	<i>Micadina phluctainoides</i>
NC_014678	<i>Phobaeticus serratipes</i>
NC_014680	<i>Heteropteryx dilatata</i>
NC_014688	<i>Megacrania alpheus adan</i>
NC_014702	<i>Ramulus irregulariterdentatus</i>
NC_014705	<i>Phraortes sp. Iriomote Island</i>
NC_015140	<i>Siphyluriscus chinensis</i>

Furthermore four Crustacea species serve as outgroup:

Accession	Name
NC_005938	<i>Speleonectes tulumensis</i>
NC_005937	<i>Hutchinsoniella macracantha</i>
NC_011598	<i>Eriocheir hepensis</i>
NC_006293	<i>Megabalanus volcano</i>

## Mollusca

Includes all Mollusca in RefSeq plus the 13 mollusc recently updated in GenBank or RefSeq:

Accession	Name
DQ991928	<i>Aplysia vaccaria</i>
DQ991930	<i>Bulla sp. TLT-2006</i>
DQ991931	<i>Chromodoris magnifica</i>
DQ991932	<i>Hydatina physis</i>
DQ991935	<i>Odontoglossa guamensis</i>
DQ991936	<i>Onchidella borealis</i>
DQ991937	<i>Sagaminopteron nigropunctatus</i>
DQ991938	<i>Smaragdinella calyculata</i>
DQ991939	<i>Thuridilla gracilis</i>
NC_015088	<i>Aplysia dactylomela</i>
NC_015091	<i>Berthellina sp. TLT-2006</i>
NC_015106	<i>Micromelo undata</i>
NC_015111	<i>Notodoris gardineri</i>

As outgroup serve pairs of species from from eight protostome phyla:

Phylum	Accession	Name
Annelida	NC_000931	<i>Platynereis dumerilii</i>
	NC_013569	<i>Whitmania pigra</i>
Brachiopoda	NC_002322	<i>Laqueus rubellus</i>
	NC_000941	<i>Terebratulina retusa</i>
Bryozoa	NC_008192	<i>Flustrellidra hispida</i>
	NC_011820	<i>Watersipora subtorquata</i>
Echiura	NC_006379	<i>Urechis caupo</i>
	NC_012768	<i>Urechis unicinctus</i>
Entoprocta	NC_010431	<i>Loxocorone allax</i>
	NC_010432	<i>Loxosomella aloxiata</i>
Nemertea	NC_012821	<i>Cephalothrix simula</i>
	NC_012889	<i>Lineus viridis</i>
Platyhelminthes	NC_008815	<i>Gyrodactylus salaris</i>
	NC_009055	<i>Microcotyle sebastis</i>
Sipuncula	NC_012618	<i>Phascolosoma esculenta</i>
	NC_011826	<i>Sipunculus nudus</i>

## Supplement 5

Program Calls:

### Alignment with MAFFT

```
mafft --quiet --reorder SEQUENCES > ALIGNMENT
```

Parameters:

SEQUENCES	Sequence file
ALIGNMENT	Alignment file

### Noisy

```
noisy --seqtype P --cutoff 0.8 -s ALIGNMENT
```

Parameters:

ALIGNMENT	Alignment file
-----------	----------------

### RAxML Rapid Bootstrap Batches

```
raxmlHPC -f a -m MODEL -s ALIGNMENT -x RAND1 -N NBOOTS \\  
-p RAND2 -n RESULT
```

Parameters:

MODEL	Model to use (PROTCATMTARTF, PROTCATMTZOAF)
ALIGNMENT	Alignment file
RAND1, RAND2	Two random numbers
NBOOTS	Number of Rapid Bootstraps to perform
RESULT	Prefix for result files

### RAxML Convergence Test

```
raxmlHPC -I TEST -z BOOTSTRAPS -m MODEL -n BOOTSTRAPS.TEST
```

Parameters:

TEST	Convergence test (autoFC autoMR autoMRE autoMRE_IGN)
BOOTSTRAPS	File containing the bootstrap trees
MODEL	Model to use (PROTCATMTARTF, PROTCATMTZOAF)
BOOTSTRAPS.TEST	Results of the convergence test

### RAxML Best Tree Search

```
raxmlHPC -m MODEL -s ALIGNMENT -N NBEST -n BESTRESULT
```

Parameters:

MODEL	Model to use (PROTCATMTARTF, PROTCATMTZOAF)
ALIGNMENT	Alignment file
NBEST	Number of distinct starting trees
BESTRESULT	Prefix for result files