

Table S1. Genome IDs used in the study

Anura	<i>Leptobrachium leishanense</i>	GCA_009667805.1
Anura	<i>Limnodynastes dumerilii</i>	GCA_011038615.1
Anura	<i>Lithobates catesbeianus (Rana catesbeiana)</i>	GCA_002284835.2
Anura	<i>Nanorana parkeri</i>	GCF_000935625.1
Anura	<i>Oophaga pumilio</i>	GCA_009801035.1
Anura	<i>Pyxicephalus adspersus</i>	GCA_004786255.1
Anura	<i>Rana temporaria</i>	GCA_009802015.1
Anura	<i>Rhinella marina</i>	GCA_900303285.1
Anura	<i>Scaphiopus couchii</i>	GCA_009364435.1
Anura	<i>Scaphiopus holbrookii</i>	GCA_009364455.1
Anura	<i>Spea bombifrons</i>	GCA_009364475.1
Anura	<i>Spea multiplicata</i>	GCA_009364415.1
Anura	<i>Xenopus laevis</i>	GCF_001663975.1
Anura	<i>Xenopus tropicalis</i>	GCF_000004195.4
Aves	<i>Gallus gallus</i>	GCF_000002315.6
Aves	<i>Meleagris gallopavo</i>	GCF_000146605.3
Aves	<i>Coturnix japonica</i>	GCF_001577835.2
Aves	<i>Eudromia elegans</i>	GCA_013398775.1
Aves	<i>Apteryx haastii</i>	GCA_003342985.1
Aves	<i>Pterocnemia pennata</i>	GCA_003342835.1
Aves	<i>Arenaria interpres</i>	GCA_013399435.1

Aves	<i>Struthio camelus</i>	GCF_000698965.1
Aves	<i>Dromaius novaehollandiae</i>	GCF_003342905.1
Aves	<i>Anomalopteryx didiformis</i>	GCA_006937325.1
Aves	<i>Casuaris casuaris</i>	GCA_013396415.1
Aves	<i>Ciconia boyciana</i>	GCA_002002965.1
Aves	<i>Vidua chalybeata</i>	GCA_013398495.1
Aves	<i>Falco peregrinus</i>	GCF_000337955.1
Aves	<i>Rhea americana</i>	GCA_003343005.1
Aves	<i>Taeniopygia guttata</i>	GCF_008822105.2
Aves	<i>Anas platyrhynchos</i>	GCF_003850225.1
Aves	<i>Eudyptula minor</i>	GCA_010080355.1
Aves	<i>Anseranas semipalmata</i>	GCA_013399115.1
Aves	<i>Branta canadensis</i>	GCA_006130075.1
Aves	<i>Gavia stellata</i>	GCF_000690875.1
Aves	<i>Alectura lathamii</i>	GCA_013399715.1
Aves	<i>Nisaetus nipalensis</i>	GCA_012487455.1
Aves	<i>Cathartes aura</i>	GCA_000699945.1
Aves	<i>Menura novaehollandiae</i>	GCA_013396355.1
Aves	<i>Eudyptes chrysocome</i>	GCA_010085355.1
Aves	<i>Nipponia nippon</i>	GCF_000708225.1
Aves	<i>Podiceps cristatus</i>	GCA_000699545.1
Aves	<i>Pandion haliaetus</i>	GCA_013401275.1
Aves	<i>Rhynchoceros jubatus</i>	GCA_013398095.1

Aves	<i>Sylvia atricapilla</i>	GCA_009819655.1
Aves	<i>Cairina moschata</i>	GCA_009194515.1
Aves	<i>Falco tinnunculus</i>	GCA_010332995.1
Aves	<i>Agapornis roseicollis</i>	GCA_002631895.1
Aves	<i>Geococcyx californianus</i>	GCA_013389885.1
Aves	<i>Bambusicola thoracicus</i>	GCA_002909625.1
Aves	<i>Accipiter gentilis</i>	GCA_012487025.1
Aves	<i>Gallirallus okinawae</i>	GCA_002003005.1
Aves	<i>Cygnus atratus</i>	GCF_013377495.1
Aves	<i>Apteryx owenii</i>	GCA_003342965.1
Aves	<i>Nymphicus hollandicus</i>	GCA_009823435.1
Aves	<i>Phasianus colchicus</i>	GCF_004143745.1
Aves	<i>Columba livia</i>	GCF_000337935.1
Aves	<i>Chrysolophus pictus</i>	GCA_003413605.1
Aves	<i>Melopsittacus undulatus</i>	GCF_012275295.1
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Aves	<i>Serinus canaria</i>	GCF_007115625.1
Aves	<i>Ficedula albicollis</i>	GCF_000247815.1
Aves	<i>Anhinga rufa</i>	GCA_013400875.1
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Aves	<i>Colinus virginianus</i>	GCA_008692595.1
Aves	<i>Parus major</i>	GCF_001522545.3
Aves	<i>Aptenodytes patagonicus</i>	GCA_010087175.1

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Aves	<i>Phylloscopus trochilus</i>	GCA_002305835.1
Aves	<i>Pseudopodoces humilis</i>	GCF_000331425.1
Aves	<i>Amazona vittata</i>	GCA_000332375.2
Aves	<i>Agelaius phoeniceus</i>	GCA_013398535.1
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Aves	<i>Alauda arvensis</i>	GCA_902810485.1
Aves	<i>Grus nigricollis</i>	GCA_004360235.1
Aves	<i>Grus monacha</i>	GCA_012487855.1
Aves	<i>Grus japonensis</i>	GCA_002002985.1
Aves	<i>Tachycineta bicolor</i>	GCA_007636935.1
Aves	<i>Grus americana</i>	GCA_013390085.1
Aves	<i>Balearica regulorum</i>	GCF_000709895.1
Aves	<i>Zosterops borbonicus</i>	GCA_007252995.1
Aves	<i>Zonotrichia albicollis</i>	GCF_000385455.1
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Aves	<i>Passer domesticus</i>	GCA_001700915.1
Aves	<i>Ara macao</i>	GCA_000400695.1
Aves	<i>Pygoscelis antarcticus</i>	GCA_010078415.1
Aves	<i>Corvus cornix</i>	GCF_000738735.2

Aves	<i>Spheniscus demersus</i>	GCA_010077935.1
Aves	<i>Sagittarius serpentarius</i>	GCA_013399415.1
Aves	<i>Lyrurus tetrix</i>	GCA_000586395.1
Aves	<i>Anser cygnoides</i>	GCF_000971095.1
Aves	<i>Egretta garzetta</i>	GCF_000687185.1
Aves	<i>Jacana jacana</i>	GCA_013400555.1
Aves	<i>Phoenicopterus ruber</i>	GCA_009819775.1
Aves	<i>Phaethon lepturus</i>	GCF_000687285.1
Aves	<i>Pelecanus crispus</i>	GCF_000687375.1
Aves	<i>Cariama cristata</i>	GCF_000690535.1
Aves	<i>Colius striatus</i>	GCF_000690715.1
Aves	<i>Eurypyga helias</i>	GCF_000690775.1
Aves	<i>Fulmarus glacialis</i>	GCF_000690835.1
Aves	<i>Haliaeetus albicilla</i>	GCF_000691405.1
Aves	<i>Merops nubicus</i>	GCF_000691845.1
Aves	<i>Manacus vitellinus</i>	GCF_001715985.3
Aves	<i>Opisthocomus hoazin</i>	GCF_000692075.1
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Aves	<i>Acanthisitta chloris</i>	GCF_000695815.1
Aves	<i>Aquila chrysaetos</i>	GCF_900496995.1
Aves	<i>Mesitornis unicolor</i>	GCF_000695765.1
Aves	<i>Corvus brachyrhynchos</i>	GCF_000691975.1
Aves	<i>Chlamydotis undulata</i>	GCA_003400225.1

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Aves	<i>Charadrius vociferus</i>	GCF_000708025.1
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Aves	<i>Cardinalis cardinalis</i>	GCA_014549065.1

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Aves	<i>Sturnus vulgaris</i>	GCF_001447265.1
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Aves	<i>Notiomystis cincta</i>	GCA_013398075.1
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Aves	<i>Athene cunicularia</i>	GCF_003259725.1
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Aves	<i>Apteryx rowi</i>	GCF_003343035.1
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Aves	<i>Paradisaea rubra</i>	GCA_003713215.1
Aves	<i>Diphyllodes magnificus</i>	GCA_003713285.1
Aves	<i>Parotia lawesii</i>	GCA_003713295.1
Aves	<i>Cicinnurus regius</i>	GCA_003713305.1
Aves	<i>Paradisaea raggiana</i>	GCA_003713265.1
Aves	<i>Pipra filicauda</i>	GCF_003945595.1
Aves	<i>Corapipo altera</i>	GCF_003945725.1
Aves	<i>Amazona collaria</i>	GCA_003947215.1
Aves	<i>Neopelma chrysocephalum</i>	GCF_003984885.1
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Aves	<i>Scolopax mira</i>	GCA_004320125.1
Aves	<i>Dendrocopos noguchii</i>	GCA_004320165.1
Aves	<i>Bubo blakistoni</i>	GCA_004320225.1
Aves	<i>Indicator maculatus</i>	GCA_013399975.1
Aves	<i>Atlantisia rogersi</i>	GCA_013401215.1
Aves	<i>Eolophus roseicapillus</i>	GCA_013397615.1
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Aves	<i>Charadrius alexandrinus</i>	GCA_008711295.1
Aves	<i>Otus sunia</i>	GCA_010365825.1

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Aves	<i>Burhinus oedicephalus</i>	GCA_008921705.1
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Aves	<i>Corvus moneduloides</i>	GCF_009650955.1
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Aves	<i>Geothlypis trichas</i>	GCA_009764595.1
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Aves	<i>Catharus ustulatus</i>	GCF_009819885.1
Aves	<i>Chiroxiphia lanceolata</i>	GCF_009829145.1
Aves	<i>Apteryx mantelli</i>	GCF_001039765.1
Aves	<i>Aratinga weddellii</i>	GCA_009867205.1
Aves	<i>Psittacus timneh</i>	GCA_009867315.1
Aves	<i>Anodorhynchus hyacinthinus</i>	GCA_009936445.1

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Aves	<i>Lorius garrulus</i>	GCA_010014925.1
Aves	<i>Pyrrhura griseipectus</i>	GCA_010014965.1
Aves	<i>Cacatua leadbeateri</i>	GCA_010015045.1
Aves	<i>Ara chloropterus</i>	GCA_010014725.1
Aves	<i>Eudypetes filholi</i>	GCA_010085365.1
Aves	<i>Megadyptes antipodes</i>	GCA_010078485.1
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Aves	<i>Eudypetes pachyrhynchus</i>	GCA_010085335.1
Aves	<i>Eudypetes sclateri</i>	GCA_010078445.1
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Aves	<i>Nettapus auritus</i>	GCA_011076525.1

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Aves	<i>Melanerpes aurifrons</i>	GCA_011125475.1
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Aves	<i>Pionus senilis</i>	GCA_011762725.1
Aves	<i>Pyrrhura molinae</i>	GCA_011763355.1
Aves	<i>Pyrrhura perlata</i>	GCA_011763455.1
Aves	<i>Phalacrocorax pelagicus</i>	GCA_002173435.1
Aves	<i>Ardeotis arabs</i>	GCA_011801015.1
Aves	<i>Molothrus ater</i>	GCF_012460135.1
Aves	<i>Nyctibius grandis</i>	GCA_013368605.1
Aves	<i>Erithacus rubecula</i>	GCA_903797595.1
Aves	<i>Crypturellus undulatus</i>	GCA_013389825.1
Aves	<i>Crypturellus soui</i>	GCA_013389845.1
Aves	<i>Piaya cayana</i>	GCA_013389865.1
Aves	<i>Sula dactylatra</i>	GCA_013389905.1
Aves	<i>Aegithalos caudatus</i>	GCA_013389925.1
Aves	<i>Fregata magnificens</i>	GCA_013389945.1
Aves	<i>Todus mexicanus</i>	GCA_013389965.1
Aves	<i>Dryoscopus gambensis</i>	GCA_013389985.1
Aves	<i>Calypomena viridis</i>	GCA_013390005.1
Aves	<i>Pitta sordida</i>	GCA_013390025.1
Aves	<i>Chloropsis hardwickii</i>	GCA_013390065.1

Aves	<i>Picathartes gymnocephalus</i>	GCA_013390045.1
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Aves	<i>Cochlearius cochlearius</i>	GCA_013396365.1
Aves	<i>Chunga burmeisteri</i>	GCA_013396505.1
Aves	<i>Lophotis ruficrista</i>	GCA_013396455.1
Aves	<i>Tachuris rubrigastra</i>	GCA_013396555.1
Aves	<i>Crotophaga sulcirostris</i>	GCA_013397455.1
Aves	<i>Mionectes macconnelli</i>	GCA_013397495.1
Aves	<i>Halcyon senegalensis</i>	GCA_013397595.1
Aves	<i>Centropus unirufus</i>	GCA_013397695.1
Aves	<i>Onychorhynchus coronatus</i>	GCA_013397825.1
Aves	<i>Nothoprocta ornata</i>	GCA_013398335.1
Aves	<i>Aphelocoma coerulescens</i>	GCA_013398375.1
Aves	<i>Rhegmatorhina hoffmannsi</i>	GCA_013398505.1
Aves	<i>Brachypodius atriceps</i>	GCA_013398615.1
Aves	<i>Copsychus sechellarum</i>	GCA_013398635.1
Aves	<i>Nothocercus julius</i>	GCA_013398735.1
Aves	<i>Spizaetus tyrannus</i>	GCA_013399215.1
Aves	<i>Piprites chloris</i>	GCA_013399295.1
Aves	<i>Rostratula benghalensis</i>	GCA_013399305.1
Aves	<i>Herpetotheres cachinnans</i>	GCA_013399355.1
Aves	<i>Sylvietta virens</i>	GCA_013399515.1
Aves	<i>Circaetus pectoralis</i>	GCA_013399555.1

Aves	<i>Glaucidium brasilianum</i>	GCA_013399595.1
Aves	<i>Cephalopterus ornatus</i>	GCA_013396775.1
Aves	<i>Vireo altiloquus</i>	GCA_013396875.1
Aves	<i>Regulus satrapa</i>	GCA_013396955.1
Aves	<i>Pachyramphus minor</i>	GCA_013397135.1
Aves	<i>Dyaphorophya castanea</i>	GCA_013397175.1
Aves	<i>Hylia prasina</i>	GCA_013397195.1
Aves	<i>Lanius ludovicianus</i>	GCA_013397235.1
Aves	<i>Burhinus bistratus</i>	GCA_013397275.1
Aves	<i>Polioptila caerulea</i>	GCA_013397295.1
Aves	<i>Toxostoma redivivum</i>	GCA_013397375.1
Aves	<i>Erythrocercus mccallii</i>	GCA_013397435.1
Aves	<i>Furnarius figulus</i>	GCA_013397465.1
Aves	<i>Neopipo cinnamomea</i>	GCA_013397415.1
Aves	<i>Pterocles burchelli</i>	GCA_013397535.1
Aves	<i>Urocynchramus pylzowi</i>	GCA_013397555.1
Aves	<i>Ptilonorhynchus violaceus</i>	GCA_013397565.1
Aves	<i>Columbina picui</i>	GCA_013397635.1
Aves	<i>Chroicocephalus maculipennis</i>	GCA_013397655.1
Aves	<i>Probosciger aterrimus</i>	GCA_013397665.1
Aves	<i>Origma solitaria</i>	GCA_013397895.1
Aves	<i>Daphoenositta chrysoptera</i>	GCA_013397915.1
Aves	<i>Dasyornis broadbenti</i>	GCA_013397935.1

Aves	<i>Grantiella picta</i>	GCA_013397955.1
Aves	<i>Machaerirhynchus nigripectus</i>	GCA_013397975.1
Aves	<i>Malurus elegans</i>	GCA_013397995.1
Aves	<i>Oreocharis arfaki</i>	GCA_013398015.1
Aves	<i>Panurus biarmicus</i>	GCA_013398035.1
Aves	<i>Ifrita kowaldi</i>	GCA_013398055.1
Aves	<i>Falcunculus frontatus</i>	GCA_013398115.1
Aves	<i>Pedionomus torquatus</i>	GCA_013398155.1
Aves	<i>Nesospiza acunhae</i>	GCA_013398715.1
Aves	<i>Sapayoa aenigma</i>	GCA_013398745.1
Aves	<i>Ibidorhyncha struthersii</i>	GCA_013398815.1
Aves	<i>Mohoua ochrocephala</i>	GCA_013398855.1
Aves	<i>Prunella himalayana</i>	GCA_013398875.1
Aves	<i>Dromas ardeola</i>	GCA_013398915.1
Aves	<i>Ceuthmochares aereus</i>	GCA_013398935.1
Aves	<i>Callaeas wilsoni</i>	GCA_013398955.1
Aves	<i>Catharus fuscescens</i>	GCA_013398975.1
Aves	<i>Galbula dea</i>	GCA_013399015.1
Aves	<i>Quiscalus mexicanus</i>	GCA_013399035.1
Aves	<i>Ramphastos sulfuratus</i>	GCA_013399055.1
Aves	<i>Chloroceryle aenea</i>	GCA_013399075.1
Aves	<i>Psophia crepitans</i>	GCA_013399095.1
Aves	<i>Odontophorus gujanensis</i>	GCA_013399175.1

Aves	<i>Dicrurus megarhynchus</i>	GCA_013399195.1
Aves	<i>Rhipidura dahl</i>	GCA_013399225.1
Aves	<i>Ciconia maguari</i>	GCA_013399255.1
Aves	<i>Trogon melanurus</i>	GCA_013399275.1
Aves	<i>Fregetta grallaria</i>	GCA_013399335.1
Aves	<i>Alopecoenas beccarii</i>	GCA_013399365.1
Aves	<i>Nyctiprogne leucopyga</i>	GCA_013399395.1
Aves	<i>Anthoscopus minutus</i>	GCA_013399455.1
Aves	<i>Chauna torquata</i>	GCA_013399475.1
Aves	<i>Corythaixoides concolor</i>	GCA_013399495.1
Aves	<i>Phaetusa simplex</i>	GCA_013399535.1
Aves	<i>Podilymbus podiceps</i>	GCA_013399565.1
Aves	<i>Amazona guildingii</i>	GCA_013399615.1
Aves	<i>Chordeiles acutipennis</i>	GCA_013399635.1
Aves	<i>Setophaga kirtlandii</i>	GCA_013399655.1
Aves	<i>Formicarius rufipectus</i>	GCA_013399695.1
Aves	<i>Mesembrinibis cayennensis</i>	GCA_013399675.1
Aves	<i>Tyrannus savana</i>	GCA_013399735.1
Aves	<i>Podargus strigoides</i>	GCA_013399755.1
Aves	<i>Zosterops hypoxanthus</i>	GCA_013399795.1
Aves	<i>Leptocoma aspasia</i>	GCA_013399835.1
Aves	<i>Semnornis frantzii</i>	GCA_013399775.1
Aves	<i>Gymnorhina tibicen</i>	GCA_013399875.1

Aves	<i>Oxyruncus cristatus</i>	GCA_013399855.1
Aves	<i>Serilophus lunatus</i>	GCA_013399895.1
Aves	<i>Illadopsis cleaveri</i>	GCA_013399915.1
Aves	<i>Cinclus mexicanus</i>	GCA_013399935.1
Aves	<i>Ploceus nigricollis</i>	GCA_013399945.1
Aves	<i>Oenanthe oenanthe</i>	GCA_013399995.1
Aves	<i>Sylvia borin</i>	GCA_014839755.1
Aves	<i>Rynchops niger</i>	GCA_013400035.1
Aves	<i>Nycticryphes semicollaris</i>	GCA_013400055.1
Aves	<i>Hippolais icterina</i>	GCA_013400075.1
Aves	<i>Rhinopomastus cyanomelas</i>	GCA_013400115.1
Aves	<i>Locustella ochotensis</i>	GCA_013400155.1
Aves	<i>Rhinoptilus africanus</i>	GCA_013400135.1
Aves	<i>Phainopepla nitens</i>	GCA_013400175.1
Aves	<i>Aramus guarauna</i>	GCA_013400195.1
Aves	<i>Cisticola juncidis</i>	GCA_013400215.1
Aves	<i>Oriolus oriolus</i>	GCA_013400235.1
Aves	<i>Sitta europaea</i>	GCA_013400255.1
Aves	<i>Rhadina sibilatrix</i>	GCA_013400275.1
Aves	<i>Bombycilla garrulus</i>	GCA_013400315.1
Aves	<i>Larus smithsonianus</i>	GCA_013400295.1
Aves	<i>Certhia brachydactyla</i>	GCA_013400355.1
Aves	<i>Eurystomus gularis</i>	GCA_013400335.1

Aves	<i>Thinocorus orbignyianus</i>	GCA_013400375.1
Aves	<i>Vidua macroura</i>	GCA_013400395.1
Aves	<i>Scytalopus superciliaris</i>	GCA_013400415.1
Aves	<i>Pycnonotus jocosus</i>	GCA_013400435.1
Aves	<i>Nicator chloris</i>	GCA_013400495.1
Aves	<i>Tricholaema leucomelas</i>	GCA_013400475.1
Aves	<i>Erpornis zantholeuca</i>	GCA_013400515.1
Aves	<i>Chloropsis cyanopogon</i>	GCA_013400585.1
Aves	<i>Scopus umbretta</i>	GCA_013400535.1
Aves	<i>Peucedramus taeniatus</i>	GCA_013400575.1
Aves	<i>Hypocryptadius cinnamomeus</i>	GCA_013400635.1
Aves	<i>Syrrhaptes paradoxus</i>	GCA_013400615.1
Aves	<i>Mystacornis crossleyi</i>	GCA_013400655.1
Aves	<i>Neodrepanis coruscans</i>	GCA_013400695.1
Aves	<i>Oxylabes madagascariensis</i>	GCA_013400675.1
Aves	<i>Pomatostomus ruficeps</i>	GCA_013400735.1
Aves	<i>Pelecanoides urinatrix</i>	GCA_013400755.1
Aves	<i>Chaetops frenatus</i>	GCA_013400775.1
Aves	<i>Centropus bengalensis</i>	GCA_013400815.1
Aves	<i>Pluvianellus socialis</i>	GCA_013400795.1
Aves	<i>Zapornia atra</i>	GCA_013400835.1
Aves	<i>Buphagus erythrorhynchus</i>	GCA_013400855.1
Aves	<i>Thalassarche chlororhynchos</i>	GCA_013400895.1

Aves	<i>Pardalotus punctatus</i>	GCA_013400915.1
Aves	<i>Turnix velox</i>	GCA_013400935.1
Aves	<i>Drymodes brunneopygia</i>	GCA_013400955.1
Aves	<i>Atrichornis clamosus</i>	GCA_013400975.1
Aves	<i>Rissa tridactyla</i>	GCA_013401015.1
Aves	<i>Uria aalge</i>	GCA_013401055.1
Aves	<i>Horornis vulcanius</i>	GCA_013401035.1
Aves	<i>Cephus grylle</i>	GCA_013401065.1
Aves	<i>Passerina amoena</i>	GCA_013401095.1
Aves	<i>Calonectris borealis</i>	GCA_013401115.1
Aves	<i>Cettia cetti</i>	GCA_013401135.1
Aves	<i>Xiphorhynchus elegans</i>	GCA_013401175.1
Aves	<i>Pteruthius melanotis</i>	GCA_013401235.1
Aves	<i>Urocolius indicus</i>	GCA_013401255.1
Aves	<i>Brachypteracias leptosomus</i>	GCA_013401335.1
Aves	<i>Glareola pratincola</i>	GCA_013401295.1
Aves	<i>Balaeniceps rex</i>	GCA_013401315.1
Aves	<i>Alcedo cyanopectus</i>	GCA_013401355.1
Aves	<i>Spizella passerina</i>	GCA_013401375.1
Aves	<i>Ardeotis kori</i>	GCA_013396375.1
Aves	<i>Anhinga anhinga</i>	GCA_013396435.1
Aves	<i>Smithornis capensis</i>	GCA_013396465.1
Aves	<i>Chaetorhynchus papuensis</i>	GCA_013396525.1

Aves	<i>Ptilorrhoa leucosticta</i>	GCA_013396485.1
Aves	<i>Rhodinocichla rosea</i>	GCA_013396575.1
Aves	<i>Nyctibius bracteatus</i>	GCA_013396595.1
Aves	<i>Oceanites oceanicus</i>	GCA_013396615.1
Aves	<i>Penelope pileata</i>	GCA_013396635.1
Aves	<i>Campylorhamphus procurvoides</i>	GCA_013396655.1
Aves	<i>Eubucco bourcierii</i>	GCA_013396675.1
Aves	<i>Sakesphorus luctuosus</i>	GCA_013396695.1
Aves	<i>Grallaria varia</i>	GCA_013396735.1
Aves	<i>Sclerurus mexicanus</i>	GCA_013396755.1
Aves	<i>Ciccaba nigrolineata</i>	GCA_013396715.1
Aves	<i>Corythaeola cristata</i>	GCA_013396815.1
Aves	<i>Psilopogon haemacephalus</i>	GCA_013396835.1
Aves	<i>Hemiprocne comata</i>	GCA_013396855.1
Aves	<i>Loxia leucoptera</i>	GCA_013396895.1
Aves	<i>Stercorarius parasiticus</i>	GCA_013396915.1
Aves	<i>Bucco capensis</i>	GCA_013396975.1
Aves	<i>Baryphthengus martii</i>	GCA_013396935.1
Aves	<i>Dicaeum eximium</i>	GCA_013396995.1
Aves	<i>Myiagra hebetior</i>	GCA_013397015.1
Aves	<i>Hydrobates tethys</i>	GCA_013397025.1
Aves	<i>Pachycephala philippinensis</i>	GCA_013397055.1
Aves	<i>Rhabdornis inornatus</i>	GCA_013397075.1

Aves	<i>Sterrhoptilus dennistouni</i>	GCA_013397095.1
Aves	<i>Edolisoma coerulescens</i>	GCA_013397115.1
Aves	<i>Irena cyanogastra</i>	GCA_013397155.1
Aves	<i>Thryothorus ludovicianus</i>	GCA_013397245.1
Aves	<i>Leucopsar rothschildi</i>	GCA_013397325.1
Aves	<i>Donacobius atricapilla</i>	GCA_013397315.1
Aves	<i>Calcarius ornatus</i>	GCA_013397715.1
Aves	<i>Cnemophilus loriae</i>	GCA_013397755.1
Aves	<i>Eulacestoma nigropectus</i>	GCA_013397775.1
Aves	<i>Orthonyx spaldingii</i>	GCA_013397795.1
Aves	<i>Aleadryas rufinucha</i>	GCA_013397815.1
Aves	<i>Melanocharis versteri</i>	GCA_013397845.1
Aves	<i>Struthidea cinerea</i>	GCA_013397865.1
Aves	<i>Aegotheles bennettii</i>	GCA_013398125.1
Aves	<i>Climacteris rufus</i>	GCA_013398175.1
Aves	<i>Steatornis caripensis</i>	GCA_013398225.1
Aves	<i>Promerops cafer</i>	GCA_013398275.1
Aves	<i>Chionis minor</i>	GCA_013398295.1
Aves	<i>Nothoprocta pentlandii</i>	GCA_013398315.1
Aves	<i>Nothocercus nigrocapillus</i>	GCA_013398345.1
Aves	<i>Pheucticus melanocephalus</i>	GCA_013398405.1
Aves	<i>Asarcornis scutulata</i>	GCA_013398475.1
Aves	<i>Certhia familiaris</i>	GCA_013398575.1

Aves	<i>Cercotrichas coryphoeus</i>	GCA_013398595.1
Aves	<i>Acrocephalus arundinaceus</i>	GCA_013398685.1
Aves	<i>Spelaeornis formosus</i>	GCA_013398795.1
Aves	<i>Corvus monedula</i>	GCA_013407035.1
Aves	<i>Columba janthina</i>	GCA_014362705.1
Aves	<i>Fratercula cirrhata</i>	GCA_014363165.1
Aves	<i>Haliaeetus pelagicus</i>	GCA_014363185.1
Aves	<i>Lycocorax pyrrhopterus</i>	GCA_014706015.1
Aves	<i>Pyrrhura lepida</i>	GCA_015163975.1
Aves	<i>Pogoniulus pusillus</i>	GCA_015220805.1
Aves	<i>Lamprotornis superbus</i>	GCA_015883425.1
Elasmobranchii	<i>Amblyraja radiata</i>	GCF_010909765.1
Elasmobranchii	<i>Carcharodon carcharias</i>	GCA_902204185.2
Elasmobranchii	<i>Chiloscyllium plagiosum</i>	GCA_004010195.1
Elasmobranchii	<i>Chiloscyllium punctatum</i>	GCA_003427335.1
Elasmobranchii	<i>Leucoraja erinacea</i>	GCA_000238235.1
Elasmobranchii	<i>Pristis pectinata</i>	GCA_009764485.1
Elasmobranchii	<i>Rhincodon typus</i>	GCF_001642345.1
Elasmobranchii	<i>Scyliorhinus torazame</i>	GCA_003427355.1
Holocephali	<i>Callorhynchus milii</i>	GCA_000165045.2
Holocephali	<i>Hydrolagus affinis</i>	GCA_012026655.1
Marsupials	<i>Gymnobelideus leadbeateri</i>	GCA_011680675.1
Marsupials	<i>Monodelphis domestica</i>	GCF_000002295.2

Marsupials	<i>Notamacropus eugenii</i>	GCA_000004035.1
Marsupials	<i>Phascogale carolinensis</i>	GCF_002099425.1
Marsupials	<i>Sarcophilus harrisii</i>	GCF_902635505.1
Marsupials	<i>Thylacinus cynocephalus</i>	GCA_007646695.1
Marsupials	<i>Trichosurus vulpecula</i>	GCA_011100635.1
Marsupials	<i>Vombatus ursinus</i>	GCF_900497805.2
Phylogeny	<i>Species</i>	Assembly
Squamata	<i>Anolis carolinensis</i>	GCF_000090745.1
Squamata	<i>Crotalus horridus</i>	GCA_001625485.1
Squamata	<i>Crotalus pyrrhus</i>	GCA_000737285.1
Squamata	<i>Crotalus viridis viridis</i>	GCA_003400415.2
Squamata	<i>Emydocephalus ijimae</i>	GCA_004319985.1
Squamata	<i>Gekko japonicus</i>	GCF_001447785.1
Squamata	<i>Hydrophis cyanocinctus</i>	GCA_004023725.1
Squamata	<i>Hydrophis hardwickii</i>	GCA_004023765.1
Squamata	<i>Hydrophis melanocephalus</i>	GCA_004320005.1
Squamata	<i>Lacerta agilis</i>	GCF_009819535.1
Squamata	<i>Lacerta bilineata</i>	GCA_900245895.1
Squamata	<i>Lacerta viridis</i>	GCA_900245905.1
Squamata	<i>Laticauda colubrina</i>	GCA_004320045.1
Squamata	<i>Laticauda laticaudata</i>	GCA_004320025.1
Squamata	<i>Naja naja</i>	GCA_009733165.1
Squamata	<i>Notechis scutatus</i>	GCF_900518725.1

Squamata	<i>Ophiophagus hannah</i>	GCA_000516915.1
Squamata	<i>Pantherophis guttatus</i>	GCF_001185365.1
Squamata	<i>Pantherophis obsoletus</i>	GCA_012654085.1
Squamata	<i>Paroedura picta</i>	GCA_003118565.1
Squamata	<i>Podarcis muralis</i>	GCF_004329235.1
Squamata	<i>Pogona vitticeps</i>	GCF_900067755.1
Squamata	<i>Protobothrops flavoviridis</i>	GCA_003402635.1
Squamata	<i>Protobothrops mucrosquamatus</i>	GCF_001527695.2
Squamata	<i>Pseudonaja textilis</i>	GCF_900518735.1
Squamata	<i>Ptyas mucosa</i>	GCA_012654045.1
Squamata	<i>Python bivittatus</i>	GCF_000186305.1
Squamata	<i>Salvator merianae</i>	GCA_003586115.2
Squamata	<i>Thamnophis elegans</i>	GCF_009769535.1
Squamata	<i>Thamnophis sirtalis</i>	GCF_001077635.1
Squamata	<i>Thermophis baileyi</i>	GCA_003457575.1
Squamata	<i>Varanus komodoensis</i>	GCA_004798865.1
Squamata	<i>Vipera berus berus</i>	GCA_000800605.1
Squamata	<i>Zootoca vivipara</i>	GCF_011800845.1
Testudines	<i>Actinemys marmorata</i>	GCA_009430475.1
Testudines	<i>Apalone spinifera</i>	GCA_000385615.1
Testudines	<i>Carettochelys insculpta</i>	GCA_007922185.1
Testudines	<i>Chelonia mydas</i>	GCF_000344595.1
Testudines	<i>Chelonoidis abingdonii</i>	GCF_003597395.1

Testudines	<i>Chelydra serpentina</i>	GCA_007922165.1
Testudines	<i>Chrysemys picta</i>	GCA_011386835.1
Testudines	<i>Cuora amboinensis</i>	GCA_004028625.2
Testudines	<i>Cuora mccordi</i>	GCA_003846335.1
Testudines	<i>Dermatemys mawii</i>	GCA_007922305.1
Testudines	<i>Dermochelys coriacea</i>	GCA_009764565.2
Testudines	<i>Emydura subglobosa</i>	GCA_007922225.1
Testudines	<i>Gopherus agassizii</i>	GCA_002896415.1
Testudines	<i>Gopherus evgoodei</i>	GCF_007399415.2
Testudines	<i>Malaclemys terrapin terrapin</i>	GCA_001728815.2
Testudines	<i>Mesoclemmys tuberculata</i>	GCA_007922155.1
Testudines	<i>Pelodiscus sinensis</i>	GCF_000230535.1
Testudines	<i>Pelusios castaneus</i>	GCA_007922175.1
Testudines	<i>Platysternon megacephalum</i>	GCA_003942145.1
Testudines	<i>Podocnemis expansa</i>	GCA_007922195.1
Testudines	<i>Terrapene carolina triunguis</i>	GCA_002925995.2
Testudines	<i>Trachemys scripta elegans</i>	GCF_013100865.1

Table S2. The presence (+) and absence (-) of *sox15*, *mpdu1*, and *fxr2* on reptile genomes used in Fig. 2a, b

Phylogeny	Species	<i>sox15</i>	<i>mpdu1</i>	<i>fxr2</i>	Synteny	Status in Figure 2
Pleurodira	<i>Emydura subglobosa</i>	+	-	+	sox15-fxr2	sox15 +
Pleurodira	<i>Mesoclemmys tuberculata</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Pleurodira	<i>Pelusios castaneus</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Pleurodira	<i>Podocnemis expansa</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Trionychoidea	<i>Carettochelys insculpta</i>	+	+	+	sox15	sox15 +
Trionychoidea	<i>Apalone spinifera</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Trionychoidea	<i>Pelodiscus sinensis</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Chelonioidea	<i>Chelonia mydas</i>	-	-	+	None	unknown
Chelonioidea	<i>Dermochelys coriacea</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Chelydridae	<i>Chelydra serpentina</i>	-	-	+	None	unknown
Kinosternoidea	<i>Dermatemys mawii</i>	-	+	+	None	unknown
Testudinoidea	<i>Actinemys marmorata</i>	+	+	+	sox15-mpdu1	sox15 +
Testudinoidea	<i>Chrysemys picta</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Testudinoidea	<i>Malaclemys terrapin terrapin</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Testudinoidea	<i>Terrapene carolina triunguis</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Testudinoidea	<i>Trachemys scripta elegans</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Testudinoidea	<i>Cuora amboinensis</i>	-	+	+	None	unknown
Testudinoidea	<i>Cuora mccordi</i>	+	+	+	None	sox15 +

Testudinoidea	<i>Platysternon megacephalum</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Testudinoidea	<i>Chelonoidis abingdonii</i>	-	+	+	mpdu1-fxr2	sox15 -
Testudinoidea	<i>Gopherus agassizii</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Testudinoidea	<i>Gopherus evgoodei</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Gekkonidae	<i>Gekko japonicus</i>	-	+	+	mpdu1-fxr2	sox15 -
Gekkonidae	<i>Paroedura picta</i>	-	+	+	mpdu1-fxr2	sox15 -
Varanidae	<i>Varanus komodoensis</i>	-	+	+	mpdu1-fxr2	sox15 -
Pythonidae	<i>Python bivittatus</i>	-	+	+	mpdu1-fxr2	sox15 -
Elapidae	<i>Laticauda colubrina</i>	-	+	+	mpdu1-fxr2	sox15 -
Elapidae	<i>Naja naja</i>	-	+	+	mpdu1-fxr2	sox15 -
Elapidae	<i>Notechis scutatus</i>	-	+	+	mpdu1-fxr2	sox15 -
Elapidae	<i>Pseudonaja textilis</i>	-	+	+	mpdu1-fxr2	sox15 -
Elapidae	<i>Laticauda laticaudata</i>	-	+	+	mpdu1-fxr2	sox15 -
Teiidae	<i>Salvator merianae</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Lacertidae	<i>Lacerta agilis</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Lacertidae	<i>Lacerta bilineata</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Lacertidae	<i>Lacerta viridis</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Lacertidae	<i>Podarcis muralis</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Lacertidae	<i>Zootoca vivipara</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Agamidae	<i>Pogona vitticeps</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Viperidae	<i>Crotalus horridus</i>	+	+	+	None	sox15 +
Viperidae	<i>Crotalus pyrrhus</i>	+	+	+	None	sox15 +
Viperidae	<i>Protobothrops mucrosquamatus</i>	+	+	+	mpdu1-sox15	sox15 +

Viperidae	<i>Vipera berus berus</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Colubridae	<i>Thamnophis elegans</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Colubridae	<i>Pantherophis guttatus</i>	+	+	+	mpdu1-sox15	sox15 +
Colubridae	<i>Pantherophis obsoletus</i>	+	+	+	mpdu1-sox15	sox15 +
Colubridae	<i>Ptyas mucosa</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Colubridae	<i>Thamnophis sirtalis</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Colubridae	<i>Thermophis baileyi</i>	+	+	+	mpdu1-sox15-fxr2	sox15 +
Dactyloidae	<i>Anolis carolinensis</i>	-	+	-	None	unknown
Viperidae	<i>Crotalus viridis viridis</i>	-	-	+	None	unknown
Viperidae	<i>Protobothrops flavoviridis</i>	-	+	+	None	unknown
Elapidae	<i>Emydocephalus ijimae</i>	-	+	+	None	unknown
Elapidae	<i>Hydrophis cyanocinctus</i>	-	+	+	None	unknown
Elapidae	<i>Hydrophis hardwickii</i>	-	+	+	None	unknown
Elapidae	<i>Hydrophis melanocephalus</i>	-	+	+	None	unknown
Elapidae	<i>Ophiophagus hannah</i>	-	-	-	None	unknown
Alligatoridae	<i>Alligator mississippiensis</i>	-	+	+	None	unknown
Alligatoridae	<i>Alligator sinensis</i>	-	+	+	mpdu1-fxr2	sox15 -
Crocodylidae	<i>Crocodylus porosus</i>	-	+	+	mpdu1-fxr2	sox15 -
Crocodylidae	<i>Gavialis gangeticus</i>	-	-	-	None	unknown
Aves	<i>Acanthisitta chloris</i>	-	-	-	None	unknown
Aves	<i>Accipiter gentilis</i>	-	+	-	None	unknown
Aves	<i>Accipiter nisus</i>	-	+	-	None	unknown
Aves	<i>Acridotheres javanicus</i>	-	-	-	None	unknown
Aves	<i>Acrocephalus arundinaceus</i>	-	+	-	None	unknown
Aves	<i>Aegithalos caudatus</i>	-	-	-	None	unknown
Aves	<i>Aegotheles bennettii</i>	-	-	-	None	unknown
Aves	<i>Agapornis roseicollis</i>	-	-	-	None	unknown
Aves	<i>Agelaius phoeniceus</i>	-	-	-	None	unknown

Aves	<i>Alauda arvensis</i>	-	-	-	None	unknown
Aves	<i>Alaudala cheleensis</i>	-	+	-	None	unknown
Aves	<i>Alca torda</i>	-	-	-	None	unknown
Aves	<i>Alcedo cyanopectus</i>	-	+	-	None	unknown
Aves	<i>Aleadryas rufinucha</i>	-	+	-	None	unknown
Aves	<i>Alectura lathamii</i>	-	-	-	None	unknown
Aves	<i>Alopecoenas beccarii</i>	-	-	-	None	unknown
Aves	<i>Amazona aestiva</i>	-	-	-	None	unknown
Aves	<i>Amazona collaria</i>	-	-	-	None	unknown
Aves	<i>Amazona guildingii</i>	-	-	-	None	unknown
Aves	<i>Amazona vittata</i>	-	-	-	None	unknown
Aves	<i>Anas platyrhynchos</i>	-	-	-	None	unknown
Aves	<i>Anas zonorhyncha</i>	-	-	-	None	unknown
Aves	<i>Anhinga anhinga</i>	-	-	-	None	unknown
Aves	<i>Anhinga rufa</i>	-	-	-	None	unknown
Aves	<i>Anodorhynchus hyacinthinus</i>	-	+	-	None	unknown
Aves	<i>Anomalopteryx didiformis</i>	-	-	-	None	unknown
Aves	<i>Anser brachyrhynchus</i>	-	-	-	None	unknown
Aves	<i>Anser cygnoides</i>	-	-	-	None	unknown
Aves	<i>Anser indicus</i>	-	-	-	None	unknown
Aves	<i>Anseranas semipalmata</i>	-	-	-	None	unknown
Aves	<i>Anthochaera phrygia</i>	-	-	-	None	unknown
Aves	<i>Anthoscopus minutus</i>	-	+	-	None	unknown
Aves	<i>Antigone vipio</i>	-	-	-	None	unknown
Aves	<i>Antrostomus carolinensis</i>	-	-	-	None	unknown
Aves	<i>Apaloderma vittatum</i>	-	-	-	None	unknown
Aves	<i>Aphelocoma coerulescens</i>	-	-	-	None	unknown
Aves	<i>Aptenodytes forsteri</i>	-	-	-	None	unknown
Aves	<i>Aptenodytes patagonicus</i>	-	-	-	None	unknown
Aves	<i>Apteryx haastii</i>	-	-	-	None	unknown
Aves	<i>Apteryx mantelli</i>	-	-	-	None	unknown
Aves	<i>Apteryx owenii</i>	-	+	-	None	unknown

Aves	<i>Apteryx rowi</i>	-	-	-	None	unknown
Aves	<i>Aquila chrysaetos</i>	-	-	-	None	unknown
Aves	<i>Ara ararauna</i>	-	+	-	None	unknown
Aves	<i>Ara chloropterus</i>	-	+	-	None	unknown
Aves	<i>Ara glaucogularis</i>	-	-	-	None	unknown
Aves	<i>Ara macao</i>	-	-	-	None	unknown
Aves	<i>Ara militaris</i>	-	+	-	None	unknown
Aves	<i>Aramus guarauna</i>	-	-	-	None	unknown
Aves	<i>Aratinga solstitialis</i>	-	-	-	None	unknown
Aves	<i>Aratinga weddellii</i>	-	-	-	None	unknown
Aves	<i>Ardeotis arabs</i>	-	-	-	None	unknown
Aves	<i>Ardeotis kori</i>	-	-	-	None	unknown
Aves	<i>Arenaria interpres</i>	-	-	-	None	unknown
Aves	<i>Asarcornis scutulata</i>	-	-	-	None	unknown
Aves	<i>Athene cunicularia</i>	-	-	-	None	unknown
Aves	<i>Atlantisia rogersi</i>	-	-	-	None	unknown
Aves	<i>Atrichornis clamosus</i>	-	+	-	None	unknown
Aves	<i>Aythya fuligula</i>	-	-	-	None	unknown
Aves	<i>Balaeniceps rex</i>	-	-	-	None	unknown
Aves	<i>Balearica regulorum</i>	-	-	-	None	unknown
Aves	<i>Bambusicola thoracicus</i>	-	-	-	None	unknown
Aves	<i>Baryphthengus martii</i>	-	-	-	None	unknown
Aves	<i>Bombicilla garrulus</i>	-	+	-	None	unknown
Aves	<i>Brachypodius atriceps</i>	-	-	-	None	unknown
Aves	<i>Brachypteracias leptosomus</i>	-	-	-	None	unknown
Aves	<i>Branta canadensis</i>	-	-	-	None	unknown
Aves	<i>Bubo blakistoni</i>	-	+	-	None	unknown
Aves	<i>Bubo bubo</i>	-	-	-	None	unknown
Aves	<i>Bucco capensis</i>	-	-	-	None	unknown
Aves	<i>Buceros rhinoceros</i>	-	-	-	None	unknown
Aves	<i>Bucorvus abyssinicus</i>	-	-	-	None	unknown
Aves	<i>Buphagus erythrorhynchus</i>	-	-	-	None	unknown

Aves	<i>Burhinus bistriatus</i>	-	-	-	None	unknown
Aves	<i>Burhinus oedicnemus</i>	-	-	-	None	unknown
Aves	<i>Buteo japonicus</i>	-	-	-	None	unknown
Aves	<i>Cacatua leadbeateri</i>	-	+	-	None	unknown
Aves	<i>Cairina moschata domestica</i>	-	+	-	None	unknown
Aves	<i>Calcarius ornatus</i>	-	-	-	None	unknown
Aves	<i>Calidris pugnax</i>	-	-	-	None	unknown
Aves	<i>Calidris pygmaea</i>	-	-	-	None	unknown
Aves	<i>Callaeas wilsoni</i>	-	+	-	None	unknown
Aves	<i>Callipepla squamata</i>	-	+	-	None	unknown
Aves	<i>Callipepla squamata</i>	-	-	-	None	unknown
Aves	<i>Caloenas nicobarica</i>	-	-	-	None	unknown
Aves	<i>Calonectris borealis</i>	-	+	-	None	unknown
Aves	<i>Calypte anna</i>	-	-	-	None	unknown
Aves	<i>Calyptomena viridis</i>	-	-	-	None	unknown
Aves	<i>Camarhynchus parvulus</i>	-	+	-	None	unknown
Aves	<i>Campylorhamphus procurvoides</i>	-	-	-	None	unknown
Aves	<i>Cardinalis cardinalis</i>	-	-	-	None	unknown
Aves	<i>Cariama cristata</i>	-	-	-	None	unknown
Aves	<i>Casuarus casuaris</i>	-	-	-	None	unknown
Aves	<i>Cathartes aura</i>	-	-	-	None	unknown
Aves	<i>Catharus fuscescens</i>	-	+	-	None	unknown
Aves	<i>Catharus ustulatus</i>	-	+	-	None	unknown
Aves	<i>Centrocercus minimus</i>	-	+	-	None	unknown
Aves	<i>Centropus bengalensis</i>	-	-	-	None	unknown
Aves	<i>Centropus unirufus</i>	-	-	-	None	unknown
Aves	<i>Cephalopterus ornatus</i>	-	-	-	None	unknown
Aves	<i>Cepphus grylle</i>	-	-	-	None	unknown
Aves	<i>Cercotrichas coryphoeus</i>	-	-	-	None	unknown
Aves	<i>Certhia brachydactyla</i>	-	-	-	None	unknown
Aves	<i>Certhia familiaris</i>	-	-	-	None	unknown

Aves	<i>Cettia cetti</i>	-	+	-	None	unknown
Aves	<i>Ceuthmochares aereus</i>	-	-	-	None	unknown
Aves	<i>Chaetops frenatus</i>	-	+	-	None	unknown
Aves	<i>Chaetorhynchus papuensis</i>	-	-	-	None	unknown
Aves	<i>Chaetura pelagica</i>	-	-	-	None	unknown
Aves	<i>Charadrius alexandrinus</i>	-	-	-	None	unknown
Aves	<i>Charadrius vociferus</i>	-	-	-	None	unknown
Aves	<i>Chauna torquata</i>	-	-	-	None	unknown
Aves	<i>Chionis minor</i>	-	-	-	None	unknown
Aves	<i>Chiroxiphia lanceolata</i>	-	-	-	None	unknown
Aves	<i>Chlamydotis macqueenii</i>	-	-	-	None	unknown
Aves	<i>Chlamydotis undulata</i>	-	-	-	None	unknown
Aves	<i>Chloroceryle aenea</i>	-	-	-	None	unknown
Aves	<i>Chloropsis cyanopogon</i>	-	+	-	None	unknown
Aves	<i>Chloropsis hardwickii</i>	-	-	-	None	unknown
Aves	<i>Chordeiles acutipennis</i>	-	-	-	None	unknown
Aves	<i>Chroicocephalus maculipennis</i>	-	-	-	None	unknown
Aves	<i>Chrysolophus pictus</i>	-	-	-	None	unknown
Aves	<i>Chunga burmeisteri</i>	-	-	-	None	unknown
Aves	<i>Ciccaba nigrolineata</i>	-	-	-	None	unknown
Aves	<i>Cicinnurus regius</i>	-	+	-	None	unknown
Aves	<i>Ciconia boyciana</i>	-	+	-	None	unknown
Aves	<i>Ciconia maguari</i>	-	-	-	None	unknown
Aves	<i>Cinclus mexicanus</i>	-	+	-	None	unknown
Aves	<i>Circaetus pectoralis</i>	-	-	-	None	unknown
Aves	<i>Cisticola juncidis</i>	-	-	-	None	unknown
Aves	<i>Climacteris rufus</i>	-	+	-	None	unknown
Aves	<i>Cnemophilus loriae</i>	-	-	-	None	unknown
Aves	<i>Cochlearius cochlearius</i>	-	-	-	None	unknown
Aves	<i>Colinus virginianus</i>	-	-	-	None	unknown
Aves	<i>Colius striatus</i>	-	-	-	None	unknown

Aves	<i>Columba janthina</i>	-	-	-	None	unknown
Aves	<i>Columba livia</i>	-	-	-	None	unknown
Aves	<i>Columbina picui</i>	-	-	-	None	unknown
Aves	<i>Copsychus sechellarum</i>	-	-	-	None	unknown
Aves	<i>Corapipo altera</i>	-	-	-	None	unknown
Aves	<i>Corvus brachyrhynchos</i>	-	-	-	None	unknown
Aves	<i>Corvus cornix</i>	-	-	-	None	unknown
Aves	<i>Corvus hawaiiensis</i>	-	+	-	None	unknown
Aves	<i>Corvus macrorhynchos</i>	-	-	-	None	unknown
Aves	<i>Corvus monedula</i>	-	-	-	None	unknown
Aves	<i>Corvus moneduloides</i>	-	+	-	None	unknown
Aves	<i>Corythaeola cristata</i>	-	-	-	None	unknown
Aves	<i>Corythaixoides concolor</i>	-	-	-	None	unknown
Aves	<i>Coturnix japonica</i>	-	-	-	None	unknown
Aves	<i>Crotophaga sulcirostris</i>	-	-	-	None	unknown
Aves	<i>Crypturellus cinnamomeus</i>	-	+	-	None	unknown
Aves	<i>Crypturellus soui</i>	-	-	-	None	unknown
Aves	<i>Crypturellus undulatus</i>	-	-	-	None	unknown
Aves	<i>Cuculus canorus</i>	-	-	-	None	unknown
Aves	<i>Cyanistes caeruleus</i>	-	+	-	None	unknown
Aves	<i>Cyanoderma ruficeps</i>	-	+	-	None	unknown
Aves	<i>Cygnus atratus</i>	-	-	-	None	unknown
Aves	<i>Cygnus cygnus</i>	-	-	-	None	unknown
Aves	<i>Cygnus olor</i>	-	-	-	None	unknown
Aves	<i>Daphoenositta chrysoptera</i>	-	+	-	None	unknown
Aves	<i>Dasyornis broadbenti</i>	-	+	-	None	unknown
Aves	<i>Dendrocopos noguchii</i>	-	+	-	None	unknown
Aves	<i>Dicaeum eximium</i>	-	+	-	None	unknown
Aves	<i>Dicrurus megarhynchus</i>	-	+	-	None	unknown
Aves	<i>Diphyllodes magnificus</i>	-	+	-	None	unknown
Aves	<i>Donacobius atricapilla</i>	-	-	-	None	unknown
Aves	<i>Dromaius novaehollandiae</i>	-	-	-	None	unknown

Aves	<i>Dromas ardeola</i>	-	-	-	None	unknown
Aves	<i>Drymodes brunneopygia</i>	-	+	-	None	unknown
Aves	<i>Dryoscopus gambensis</i>	-	+	-	None	unknown
Aves	<i>Dyaphorophya castanea</i>	-	-	-	None	unknown
Aves	<i>Eclectus roratus</i>	-	-	-	None	unknown
Aves	<i>Edolisoma coerulescens</i>	-	+	-	None	unknown
Aves	<i>Egretta garzetta</i>	-	-	-	None	unknown
Aves	<i>Emberiza fucata</i>	-	-	-	None	unknown
Aves	<i>Empidonax traillii</i>	-	-	-	None	unknown
Aves	<i>Eolophus roseicapillus</i>	-	-	-	None	unknown
Aves	<i>Eopsaltria australis</i>	-	+	-	None	unknown
Aves	<i>Eremophila alpestris</i>	-	-	-	None	unknown
Aves	<i>Eremophila alpestris peregrina</i>	-	+	-	None	unknown
Aves	<i>Erithacus rubecula</i>	-	-	-	None	unknown
Aves	<i>Erpornis zantholeuca</i>	-	+	-	None	unknown
Aves	<i>Erythrocercus mccallii</i>	-	+	-	None	unknown
Aves	<i>Erythrura gouldiae</i>	-	-	-	None	unknown
Aves	<i>Eubucco bourcierii</i>	-	-	-	None	unknown
Aves	<i>Eudromia elegans</i>	-	-	-	None	unknown
Aves	<i>Eudytes chrysocome</i>	-	-	-	None	unknown
Aves	<i>Eudytes chrysolophus</i>	-	-	-	None	unknown
Aves	<i>Eudytes filholi</i>	-	-	-	None	unknown
Aves	<i>Eudytes moseleyi</i>	-	-	-	None	unknown
Aves	<i>Eudytes pachyrhynchus</i>	-	+	-	None	unknown
Aves	<i>Eudytes robustus</i>	-	+	-	None	unknown
Aves	<i>Eudytes schlegeli</i>	-	+	-	None	unknown
Aves	<i>Eudytes sclateri</i>	-	-	-	None	unknown
Aves	<i>Eudiptula albosignata</i>	-	-	-	None	unknown
Aves	<i>Eudiptula minor</i>	-	-	-	None	unknown
Aves	<i>Eudiptula novaehollandiae</i>	-	-	-	None	unknown
Aves	<i>Eulacestoma nigropectus</i>	-	+	-	None	unknown

Aves	<i>Eupsittula pertinax</i>	-	+	-	None	unknown
Aves	<i>Eurypyga helias</i>	-	-	-	None	unknown
Aves	<i>Eurystomus gularis</i>	-	-	-	None	unknown
Aves	<i>Falco cherrug</i>	-	-	-	None	unknown
Aves	<i>Falco peregrinus</i>	-	-	-	None	unknown
Aves	<i>Falco rusticolus</i>	-	-	-	None	unknown
Aves	<i>Falco tinnunculus</i>	-	-	-	None	unknown
Aves	<i>Falcunculus frontatus</i>	-	+	-	None	unknown
Aves	<i>Ficedula albicollis</i>	-	-	-	None	unknown
Aves	<i>Formicarius rufipectus</i>	-	-	-	None	unknown
Aves	<i>Fratercula cirrhata</i>	-	-	-	None	unknown
Aves	<i>Fregata magnificens</i>	-	-	-	None	unknown
Aves	<i>Fregetta grallaria</i>	-	-	-	None	unknown
Aves	<i>Fringilla coelebs</i>	-	-	-	None	unknown
Aves	<i>Fulica atra</i>	-	-	-	None	unknown
Aves	<i>Fulmarus glacialis</i>	-	-	-	None	unknown
Aves	<i>Furnarius figulus</i>	-	-	-	None	unknown
Aves	<i>Galbula dea</i>	-	-	-	None	unknown
Aves	<i>Gallirallus okinawae</i>	-	-	-	None	unknown
Aves	<i>Gallus gallus</i>	-	-	-	None	unknown
Aves	<i>Gavia stellata</i>	-	-	-	None	unknown
Aves	<i>Geococcyx californianus</i>	-	-	-	None	unknown
Aves	<i>Geospiza fortis</i>	-	+	-	None	unknown
Aves	<i>Geothlypis trichas</i>	-	-	-	None	unknown
Aves	<i>Glareola pratincola</i>	-	-	-	None	unknown
Aves	<i>Glaucidium brasilianum</i>	-	-	-	None	unknown
Aves	<i>Grallaria varia</i>	-	-	-	None	unknown
Aves	<i>Grantiella picta</i>	-	+	-	None	unknown
Aves	<i>Grus americana</i>	-	-	-	None	unknown
Aves	<i>Grus japonensis</i>	-	-	-	None	unknown
Aves	<i>Grus monacha</i>	-	+	-	None	unknown
Aves	<i>Grus nigricollis</i>	-	-	-	None	unknown

Aves	<i>Guaruba guarouba</i>	-	-	-	None	unknown
Aves	<i>Gymnorhina tibicen</i>	-	-	-	None	unknown
Aves	<i>Halcyon senegalensis</i>	-	-	-	None	unknown
Aves	<i>Haliaeetus albicilla</i>	-	-	-	None	unknown
Aves	<i>Haliaeetus leucocephalus</i>	-	-	-	None	unknown
Aves	<i>Haliaeetus pelagicus</i>	-	+	-	None	unknown
Aves	<i>Heliornis fulica</i>	-	-	-	None	unknown
Aves	<i>Hemignathus virens</i>	-	+	-	None	unknown
Aves	<i>Hemignathus wilsoni</i>	-	+	-	None	unknown
Aves	<i>Hemiprocne comata</i>	-	-	-	None	unknown
Aves	<i>Herpetotheres cachinnans</i>	-	-	-	None	unknown
Aves	<i>Heteronetta atricapilla</i>	-	-	-	None	unknown
Aves	<i>Himantopus himantopus</i>	-	-	-	None	unknown
Aves	<i>Hippolais icterina</i>	-	+	-	None	unknown
Aves	<i>Hirundo rustica</i>	-	-	-	None	unknown
Aves	<i>Horornis vulcanius</i>	-	-	-	None	unknown
Aves	<i>Hydrobates tethys</i>	-	-	-	None	unknown
Aves	<i>Hylia prasina</i>	-	-	-	None	unknown
Aves	<i>Hypocryptadius cinnamomeus</i>	-	+	-	None	unknown
Aves	<i>Ibidorhyncha struthersii</i>	-	-	-	None	unknown
Aves	<i>Ifrita kowaldi</i>	-	+	-	None	unknown
Aves	<i>Illadopsis cleaveri</i>	-	-	-	None	unknown
Aves	<i>Indicator maculatus</i>	-	+	-	None	unknown
Aves	<i>Irena cyanogastra</i>	-	+	-	None	unknown
Aves	<i>Jacana jacana</i>	-	-	-	None	unknown
Aves	<i>Junco hyemalis</i>	-	+	-	None	unknown
Aves	<i>Lagopus muta japonica</i>	-	+	-	None	unknown
Aves	<i>Lamprotornis superbus</i>	-	-	-	None	unknown
Aves	<i>Lanius ludovicianus</i>	-	+	-	None	unknown
Aves	<i>Larus smithsonianus</i>	-	-	-	None	unknown
Aves	<i>Leiothrix lutea</i>	-	-	-	None	unknown

Aves	<i>Lepidothrix coronata</i>	-	-	-	None	unknown
Aves	<i>Leptocoma aspasia</i>	-	-	-	None	unknown
Aves	<i>Leptosomus discolor</i>	-	-	-	None	unknown
Aves	<i>Leucopsar rothschildi</i>	-	-	-	None	unknown
Aves	<i>Lichenostomus cassidix</i>	-	+	-	None	unknown
Aves	<i>Limosa lapponica</i>	-	-	-	None	unknown
Aves	<i>Locustella ochotensis</i>	-	-	-	None	unknown
Aves	<i>Lonchura striata domestica</i>	-	+	-	None	unknown
Aves	<i>Lophotis ruficrista</i>	-	-	-	None	unknown
Aves	<i>Lorius garrulus</i>	-	+	-	None	unknown
Aves	<i>Loxia curvirostra</i>	-	+	-	None	unknown
Aves	<i>Loxia leucoptera</i>	-	+	-	None	unknown
Aves	<i>Lycocorax pyrrhopterus</i>	-	-	-	None	unknown
Aves	<i>Lyrurus tetrix</i>	-	-	-	None	unknown
Aves	<i>Machaerirhynchus nigripectus</i>	-	-	-	None	unknown
Aves	<i>Malurus cyaneus</i>	-	-	-	None	unknown
Aves	<i>Malurus elegans</i>	-	+	-	None	unknown
Aves	<i>Manacus vitellinus</i>	-	-	-	None	unknown
Aves	<i>Megadyptes antipodes</i>	-	-	-	None	unknown
Aves	<i>Melanerpes aurifrons</i>	-	+	-	None	unknown
Aves	<i>Melanocharis versteri</i>	-	-	-	None	unknown
Aves	<i>Meleagris gallopavo</i>	-	-	-	None	unknown
Aves	<i>Melopsittacus undulatus</i>	-	+	-	None	unknown
Aves	<i>Melospiza melodia</i>	-	+	-	None	unknown
Aves	<i>Menura novaehollandiae</i>	-	-	-	None	unknown
Aves	<i>Merops nubicus</i>	-	-	-	None	unknown
Aves	<i>Mesembrinibis cayennensis</i>	-	-	-	None	unknown
Aves	<i>Mesitornis unicolor</i>	-	-	-	None	unknown
Aves	<i>Mionectes macconnelli</i>	-	-	-	None	unknown
Aves	<i>Mixornis gularis</i>	-	-	-	None	unknown
Aves	<i>Mohoua ochrocephala</i>	-	-	-	None	unknown

Aves	<i>Molothrus ater</i>	-	-	-	None	unknown
Aves	<i>Motacilla alba</i>	-	-	-	None	unknown
Aves	<i>Myiagra hebetior</i>	-	-	-	None	unknown
Aves	<i>Myiopsitta monachus</i>	-	+	-	None	unknown
Aves	<i>Mystacornis crossleyi</i>	-	-	-	None	unknown
Aves	<i>Nannopterum auritus</i>	-	+	-	None	unknown
Aves	<i>Nannopterum brasilianus</i>	-	+	-	None	unknown
Aves	<i>Nannopterum harrisi</i>	-	+	-	None	unknown
Aves	<i>Neodrepanis coruscans</i>	-	-	-	None	unknown
Aves	<i>Neopelma chrysocephalum</i>	-	-	-	None	unknown
Aves	<i>Neopipo cinnamomea</i>	-	-	-	None	unknown
Aves	<i>Nesospiza acunhae</i>	-	+	-	None	unknown
Aves	<i>Nestor notabilis</i>	-	+	-	None	unknown
Aves	<i>Nettapus auritus</i>	-	-	-	None	unknown
Aves	<i>Nicator chloris</i>	-	+	-	None	unknown
Aves	<i>Nipponia nippon</i>	-	-	-	None	unknown
Aves	<i>Nisaetus nipalensis</i>	-	+	-	None	unknown
Aves	<i>Nothocercus julius</i>	-	-	-	None	unknown
Aves	<i>Nothocercus nigrocapillus</i>	-	-	-	None	unknown
Aves	<i>Nothoprocta ornata</i>	-	-	-	None	unknown
Aves	<i>Nothoprocta pentlandii</i>	-	-	-	None	unknown
Aves	<i>Nothoprocta perdicaria</i>	-	-	-	None	unknown
Aves	<i>Notiomystis cincta</i>	-	+	-	None	unknown
Aves	<i>Numida meleagris</i>	-	-	-	None	unknown
Aves	<i>Nyctibius bracteatus</i>	-	-	-	None	unknown
Aves	<i>Nyctibius grandis</i>	-	-	-	None	unknown
Aves	<i>Nycticryphes semicollaris</i>	-	-	-	None	unknown
Aves	<i>Nyctiprogne leucopyga</i>	-	-	-	None	unknown
Aves	<i>Nymphicus hollandicus</i>	-	+	-	None	unknown
Aves	<i>Oceanites oceanicus</i>	-	-	-	None	unknown
Aves	<i>Odontophorus gujanensis</i>	-	-	-	None	unknown
Aves	<i>Oenanthe oenanthe</i>	-	+	-	None	unknown

Aves	<i>Onychorhynchus coronatus</i>	-	+	-	None	unknown
Aves	<i>Opisthocomus hoazin</i>	-	-	-	None	unknown
Aves	<i>Oreocharis arfaki</i>	-	+	-	None	unknown
Aves	<i>Oreotrochilus melanogaster</i>	-	-	-	None	unknown
Aves	<i>Origma solitaria</i>	-	+	-	None	unknown
Aves	<i>Oriolus oriolus</i>	-	-	-	None	unknown
Aves	<i>Orthonyx spaldingii</i>	-	+	-	None	unknown
Aves	<i>Otus sunia</i>	-	-	-	None	unknown
Aves	<i>Oxylabes madagascariensis</i>	-	-	-	None	unknown
Aves	<i>Oxyruncus cristatus</i>	-	-	-	None	unknown
Aves	<i>Oxyura jamaicensis</i>	-	-	-	None	unknown
Aves	<i>Pachycephala philippinensis</i>	-	-	-	None	unknown
Aves	<i>Pachyramphus minor</i>	-	-	-	None	unknown
Aves	<i>Pandion haliaetus</i>	-	-	-	None	unknown
Aves	<i>Panurus biarmicus</i>	-	-	-	None	unknown
Aves	<i>Paradisaea raggiana</i>	-	+	-	None	unknown
Aves	<i>Paradisaea rubra</i>	-	+	-	None	unknown
Aves	<i>Paradoxornis webbianus</i>	-	-	-	None	unknown
Aves	<i>Pardalotus punctatus</i>	-	-	-	None	unknown
Aves	<i>Parotia lawesii</i>	-	+	-	None	unknown
Aves	<i>Parus major</i>	-	-	-	None	unknown
Aves	<i>Passer domesticus</i>	-	+	-	None	unknown
Aves	<i>Passer montanus</i>	-	+	-	None	unknown
Aves	<i>Passerina amoena</i>	-	-	-	None	unknown
Aves	<i>Patagioenas fasciata monilis</i>	-	+	-	None	unknown
Aves	<i>Pavo cristatus</i>	-	+	-	None	unknown
Aves	<i>Pedionomus torquatus</i>	-	-	-	None	unknown
Aves	<i>Pelecanoides urinatrix</i>	-	-	-	None	unknown
Aves	<i>Pelecanus crispus</i>	-	-	-	None	unknown
Aves	<i>Penelope pileata</i>	-	-	-	None	unknown
Aves	<i>Peucedramus taeniatus</i>	-	+	-	None	unknown
Aves	<i>Phaethon lepturus</i>	-	-	-	None	unknown

Aves	<i>Phaetusa simplex</i>	-	-	-	None	unknown
Aves	<i>Phainopepla nitens</i>	-	+	-	None	unknown
Aves	<i>Phalacrocorax carbo</i>	-	-	-	None	unknown
Aves	<i>Phalacrocorax pelagicus</i>	-	+	-	None	unknown
Aves	<i>Phasianus colchicus</i>	-	+	-	None	unknown
Aves	<i>Pheucticus melanocephalus</i>	-	-	-	None	unknown
Aves	<i>Phoebastria albatrus</i>	-	-	-	None	unknown
Aves	<i>Phoenicopterus ruber</i>	-	-	-	None	unknown
Aves	<i>Phylloscopus plumbeitarsus</i>	-	+	-	None	unknown
Aves	<i>Phylloscopus trochiloides viridanus</i>	-	+	-	None	unknown
Aves	<i>Phylloscopus trochilus acredula</i>	-	+	-	None	unknown
Aves	<i>Piaya cayana</i>	-	-	-	None	unknown
Aves	<i>Picathartes gymnocephalus</i>	-	+	-	None	unknown
Aves	<i>Picoides pubescens</i>	-	-	-	None	unknown
Aves	<i>Pionus senilis</i>	-	+	-	None	unknown
Aves	<i>Pipra filicauda</i>	-	+	-	None	unknown
Aves	<i>Piprites chloris</i>	-	-	-	None	unknown
Aves	<i>Pitta sordida</i>	-	-	-	None	unknown
Aves	<i>Ploceus nigricollis</i>	-	+	-	None	unknown
Aves	<i>Phuvianellus socialis</i>	-	-	-	None	unknown
Aves	<i>Podargus strigoides</i>	-	-	-	None	unknown
Aves	<i>Podiceps cristatus</i>	-	-	-	None	unknown
Aves	<i>Podilymbus podiceps</i>	-	-	-	None	unknown
Aves	<i>Poecile atricapillus</i>	-	-	-	None	unknown
Aves	<i>Pogoniulus pusillus</i>	-	+	-	None	unknown
Aves	<i>Polioptila caerulea</i>	-	-	-	None	unknown
Aves	<i>Pomatorhinus ruficollis</i>	-	-	-	None	unknown
Aves	<i>Pomatostomus ruficeps</i>	-	+	-	None	unknown
Aves	<i>Probosciger aterrimus</i>	-	-	-	None	unknown
Aves	<i>Promerops cafer</i>	-	-	-	None	unknown

Aves	<i>Prunella fulvescens</i>	-	+	-	None	unknown
Aves	<i>Prunella himalayana</i>	-	-	-	None	unknown
Aves	<i>Pseudopodoces humilis</i>	-	+	-	None	unknown
Aves	<i>Pseudorectes ferrugineus</i>	-	+	-	None	unknown
Aves	<i>Psilopogon haemacephalus</i>	-	-	-	None	unknown
Aves	<i>Psittacula krameri</i>	-	-	-	None	unknown
Aves	<i>Psittacus erithacus</i>	-	+	-	None	unknown
Aves	<i>Psittacus timneh</i>	-	-	-	None	unknown
Aves	<i>Psitteuteles goldiei</i>	-	+	-	None	unknown
Aves	<i>Psophia crepitans</i>	-	-	-	None	unknown
Aves	<i>Pterocles burchelli</i>	-	-	-	None	unknown
Aves	<i>Pterocles gutturalis</i>	-	-	-	None	unknown
Aves	<i>Pterocles orientalis</i>	-	-	-	None	unknown
Aves	<i>Pterocnemia pennata</i>	-	+	-	None	unknown
Aves	<i>Pteruthius melanotis</i>	-	-	-	None	unknown
Aves	<i>Ptilonorhynchus violaceus</i>	-	-	-	None	unknown
Aves	<i>Ptilorrhoa leucosticta</i>	-	-	-	None	unknown
Aves	<i>Pycnonotus jocosus</i>	-	-	-	None	unknown
Aves	<i>Pygoscelis adeliae</i>	-	-	-	None	unknown
Aves	<i>Pygoscelis antarcticus</i>	-	-	-	None	unknown
Aves	<i>Pygoscelis papua</i>	-	-	-	None	unknown
Aves	<i>Pyrrhura frontalis</i>	-	+	-	None	unknown
Aves	<i>Pyrrhura griseipectus</i>	-	-	-	None	unknown
Aves	<i>Pyrrhura lepida</i>	-	-	-	None	unknown
Aves	<i>Pyrrhura molinae</i>	-	-	-	None	unknown
Aves	<i>Pyrrhura perlata</i>	-	+	-	None	unknown
Aves	<i>Quiscalus mexicanus</i>	-	+	-	None	unknown
Aves	<i>Ramphastos sulfuratus</i>	-	-	-	None	unknown
Aves	<i>Recurvirostra avosetta</i>	-	-	-	None	unknown
Aves	<i>Regulus satrapa</i>	-	-	-	None	unknown
Aves	<i>Rhabdornis inornatus</i>	-	+	-	None	unknown
Aves	<i>Rhadina sibilatrix</i>	-	-	-	None	unknown

Aves	<i>Rhagologus leucostigma</i>	-	+	-	None	unknown
Aves	<i>Rhea americana</i>	-	-	-	None	unknown
Aves	<i>Rhegmatorhina hoffmannsi</i>	-	-	-	None	unknown
Aves	<i>Rhinopomastus cyanomelas</i>	-	+	-	None	unknown
Aves	<i>Rhinoptilus africanus</i>	-	-	-	None	unknown
Aves	<i>Rhipidura dahli</i>	-	+	-	None	unknown
Aves	<i>Rhodinocichla rosea</i>	-	-	-	None	unknown
Aves	<i>Rhynochetos jubatus</i>	-	-	-	None	unknown
Aves	<i>Rissa tridactyla</i>	-	-	-	None	unknown
Aves	<i>Rostratula benghalensis</i>	-	-	-	None	unknown
Aves	<i>Rynchops niger</i>	-	-	-	None	unknown
Aves	<i>Sagittarius serpentarius</i>	-	-	-	None	unknown
Aves	<i>Sakesphorus luctuosus</i>	-	-	-	None	unknown
Aves	<i>Sapayoa aenigma</i>	-	-	-	None	unknown
Aves	<i>Saxicola maurus maurus</i>	-	+	-	None	unknown
Aves	<i>Sclerurus mexicanus</i>	-	-	-	None	unknown
Aves	<i>Scolopax mira</i>	-	+	-	None	unknown
Aves	<i>Scopus umbretta</i>	-	-	-	None	unknown
Aves	<i>Scytalopus supercilii</i>	-	-	-	None	unknown
Aves	<i>Semnornis frantzii</i>	-	+	-	None	unknown
Aves	<i>Serilophus lunatus</i>	-	-	-	None	unknown
Aves	<i>Serinus canaria</i>	-	-	-	None	unknown
Aves	<i>Setophaga coronata</i>	-	-	-	None	unknown
Aves	<i>Setophaga kirtlandii</i>	-	-	-	None	unknown
Aves	<i>Sialia sialis</i>	-	-	-	None	unknown
Aves	<i>Sitta europaea</i>	-	+	-	None	unknown
Aves	<i>Smithornis capensis</i>	-	-	-	None	unknown
Aves	<i>Spelaeoris formosus</i>	-	-	-	None	unknown
Aves	<i>Spheniscus demersus</i>	-	-	-	None	unknown
Aves	<i>Spheniscus humboldti</i>	-	-	-	None	unknown
Aves	<i>Spheniscus magellanicus</i>	-	-	-	None	unknown
Aves	<i>Spheniscus mendiculus</i>	-	-	-	None	unknown

Aves	<i>Spizaetus tyrannus</i>	-	-	-	None	unknown
Aves	<i>Spizella passerina</i>	-	+	-	None	unknown
Aves	<i>Sporophila hypoxantha</i>	-	+	-	None	unknown
Aves	<i>Steatornis caripensis</i>	-	-	-	None	unknown
Aves	<i>Stercorarius parasiticus</i>	-	-	-	None	unknown
Aves	<i>Sterna hirundo</i>	-	-	-	None	unknown
Aves	<i>Sterrhoptilus dennistouni</i>	-	+	-	None	unknown
Aves	<i>Stictonetta naevosa</i>	-	-	-	None	unknown
Aves	<i>Streptopelia turtur</i>	-	-	-	None	unknown
Aves	<i>Strigops habroptila</i>	-	+	-	None	unknown
Aves	<i>Strix occidentalis</i>	-	-	-	None	unknown
Aves	<i>Struthidea cinerea</i>	-	+	-	None	unknown
Aves	<i>Struthio camelus</i>	-	-	-	None	unknown
Aves	<i>Sturnus vulgaris</i>	-	-	-	None	unknown
Aves	<i>Sula dactylatra</i>	-	-	-	None	unknown
Aves	<i>Sylvia atricapilla</i>	-	-	-	None	unknown
Aves	<i>Sylvia borin</i>	-	-	-	None	unknown
Aves	<i>Sylvietta virens</i>	-	-	-	None	unknown
Aves	<i>Syrmaticus mikado</i>	-	+	-	None	unknown
Aves	<i>Syrrhaptes paradoxus</i>	-	-	-	None	unknown
Aves	<i>Tachuris rubrigastra</i>	-	-	-	None	unknown
Aves	<i>Tachycineta bicolor</i>	-	+	-	None	unknown
Aves	<i>Taeniopygia guttata</i>	-	-	-	None	unknown
Aves	<i>Tauraco erythrolophus</i>	-	-	-	None	unknown
Aves	<i>Tetrax tetrax</i>	-	-	-	None	unknown
Aves	<i>Thalassarche chlororhynchos</i>	-	-	-	None	unknown
Aves	<i>Thinocorus orbignyianus</i>	-	-	-	None	unknown
Aves	<i>Thryothorus ludovicianus</i>	-	-	-	None	unknown
Aves	<i>Tichodroma muraria</i>	-	+	-	None	unknown
Aves	<i>Tinamus guttatus</i>	-	-	-	None	unknown
Aves	<i>Todus mexicanus</i>	-	-	-	None	unknown
Aves	<i>Toxostoma redivivum</i>	-	+	-	None	unknown

Aves	<i>Tricholaema leucomelas</i>	-	+	-	None	unknown
Aves	<i>Trogon melanurus</i>	-	-	-	None	unknown
Aves	<i>Turdus rufiventris</i>	-	+	-	None	unknown
Aves	<i>Turnix velox</i>	-	-	-	None	unknown
Aves	<i>Tympanuchus cupido pinnatus</i>	-	+	-	None	unknown
Aves	<i>Tyrannus savana</i>	-	-	-	None	unknown
Aves	<i>Upupa epops</i>	-	-	-	None	unknown
Aves	<i>Uria aalge</i>	-	-	-	None	unknown
Aves	<i>Uria lomvia</i>	-	-	-	None	unknown
Aves	<i>Urocolius indicus</i>	-	-	-	None	unknown
Aves	<i>Urocynchramus pylzowi</i>	-	-	-	None	unknown
Aves	<i>Vidua chalybeata</i>	-	+	-	None	unknown
Aves	<i>Vidua macroura</i>	-	+	-	None	unknown
Aves	<i>Vireo altiloquus</i>	-	+	-	None	unknown
Aves	<i>Xiphorhynchus elegans</i>	-	-	-	None	unknown
Aves	<i>Zapornia atra</i>	-	-	-	None	unknown
Aves	<i>Zonotrichia albicollis</i>	-	-	-	None	unknown
Aves	<i>Zosterops borbonicus</i>	-	+	-	None	unknown
Aves	<i>Zosterops hypoxanthus</i>	-	+	-	None	unknown
Aves	<i>Zosterops lateralis</i>	-	-	-	None	unknown
Aves	<i>Zosterops pallidus</i>	-	+	-	None	unknown

Table S3. Genbank numbers and range of the genes used in the analyses

Species	Gene	Genbank	Range
<i>Amblyraja radiata</i>	<i>sox1</i>	XM_033023155.1	512-1537
<i>Callorhinchus milii</i>	<i>sox1</i>	XM_007891764.1	108-1160
<i>Chiloscyllium plagiosum</i>	<i>sox1</i>	CM012961.1	12899087-12901711
<i>Chiloscyllium punctatum</i>	<i>sox1</i>	BEZZ01000638.1	417489-418532
<i>Erpetoichthys calabaricus</i>	<i>sox1</i>	XM_028801232.1	208-1248
<i>Gallus gallus</i>	<i>sox1</i>	NM_204333.1	209-1330
<i>Geotrypetes seraphini</i>	<i>sox1</i>	XM_033950250.1	1-1152
<i>Homo sapiens</i>	<i>sox1</i>	NM_005986.3	511-1686
<i>Hydrolagus affinis</i>	<i>sox1</i>	JAAILG010004180.1	13345-15969
<i>Lepisosteus oculatus</i>	<i>sox1</i>	XM_015364217.1	406-1437
<i>Maylandia zebra</i>	<i>sox1</i>	XM_004573625.3	322-1380
<i>Podarcis muralis</i>	<i>sox1</i>	XM_028728115.1	784-1962
<i>Pristis pectinata</i>	<i>sox1</i>	CM019865.1	87868199-87869923
<i>Scyliorhinus torazame</i>	<i>sox1</i>	BFAA01079915.1	319-1161
<i>Andrias davidianus</i>	<i>sox15</i>	KJ623265.1	271-1128
<i>Bos taurus</i>	<i>sox15</i>	NM_001192075.2	239-940
<i>Canis lupus</i>	<i>sox15</i>	XM_003434613.4	431-1132
<i>Chiloscyllium plagiosum</i>	<i>sox15</i>	CM013003.1	899095-901719
<i>Chiloscyllium punctatum</i>	<i>sox15</i>	BEZZ01008499.1	3-830
<i>Chrysemys picta bellii</i>	<i>sox15</i>	XM_005313716.3	173-790

<i>Dasyopus novemcinctus</i>	<i>sox15</i>	XM_004468741.3	425-1126
<i>Geotrypetes seraphini</i>	<i>sox15</i>	XM_033925163.1	188-1078
<i>Gopherus evgoodei</i>	<i>sox15</i>	XM_030548210.1	185-817
<i>Homo sapiens</i>	<i>sox15</i>	NM_006942.2	419-1120
<i>Lacerta agilis</i>	<i>sox15</i>	XM_033169758.1	7-810
<i>Latimeria chalumnae</i>	<i>sox15</i>	NW_005820241.1	160414-159828,141203-140948
<i>Loxodonta africana</i>	<i>sox15</i>	XM_003416759.2	766-1443
<i>Microcaecilia unicolor</i>	<i>sox15</i>	XM_030186896.1	190-1080
<i>Mus musculus</i>	<i>sox15</i>	NM_009235.2	337-1032
<i>Pantherophis guttatus</i>	<i>sox15</i>	XM_034407244.1	67-804
<i>Pelodiscus sinensis</i>	<i>sox15</i>	XM_014576967.2	802-1419
<i>Phascolarctos cinereus</i>	<i>sox15</i>	XM_020966486.1	468-1118
<i>Podarcis muralis</i>	<i>sox15</i>	XM_028703808.1	66-857
<i>Pristis pectinata</i>	<i>sox15</i>	CM019891.1	13017081-13019705
<i>Pyxicephalus adspersus</i>	<i>sox15</i>	CM016417.1	1996676-1996850,1997840-1999089
<i>Rana catesbeiana</i>	<i>sox15</i>	KV934738.1	1174-2525,4128-4302
<i>Rhinatrema bivittatum</i>	<i>sox15</i>	XM_029581823.1	37-930
<i>Trachemys scripta</i>	<i>sox15</i>	XM_034756827.1	1-621
<i>Vombatus ursinus</i>	<i>sox15</i>	XM_027857251.1	1502-2188
<i>Xenopus laevis</i>	<i>sox15</i>	NM_001087732.1	132-722
<i>Xenopus tropicalis</i>	<i>sox15</i>	NM_001126574.1	55-654
<i>Zootoca vivipara</i>	<i>sox15</i>	XM_035137001.1	1-804

<i>Erpetoichthys calabaricus</i>	<i>sox19</i>	XM_028798433.1	490-1383
<i>Esox lucius</i>	<i>sox19</i>	XM_010899168.3	439-1338
<i>Gadus morhua</i>	<i>sox19</i>	XM_030338203.1	458-1459
<i>Lepisosteus oculatus</i>	<i>sox19</i>	XM_006627561.2	512-1423
<i>Maylandia zebra</i>	<i>sox19</i>	XM_004575969.5	519-1442
<i>Nothobranchius furzeri</i>	<i>sox19</i>	XM_015957776.1	1021-1947
<i>Oryzias latipes</i>	<i>sox19</i>	XM_023966042.1	302-1210
<i>Paralichthys olivaceus</i>	<i>sox19</i>	XM_020100199.1	434-1354
<i>Parambassis ranga</i>	<i>sox19</i>	XM_028429300.1	299-1219
<i>Carassius auratus</i>	<i>sox19a</i>	XM_026256716.1	303-1193
<i>Chanos chanos</i>	<i>sox19a</i>	XM_030792735.1	1-894
<i>Danio rerio</i>	<i>sox19a</i>	NM_130908.2	268-1161
<i>Electrophorus electricus</i>	<i>sox19a</i>	XM_026998430.2	332-1234
<i>Sinocyclocheilus</i> <i>anshuiensis</i>	<i>sox19a</i>	XM_016485152.1	262-1152
<i>Carassius auratus</i>	<i>sox19b</i>	XM_026267054.1	311-1189
<i>Chanos chanos</i>	<i>sox19b</i>	XM_030780317.1	1-888
<i>Danio rerio</i>	<i>sox19b</i>	NM_131702.1	259-1140
<i>Electrophorus electricus</i>	<i>sox19b</i>	XM_027015559.2	322-1203
<i>Sinocyclocheilus</i> <i>anshuiensis</i>	<i>sox19b</i>	XM_016507136.1	298-1170
<i>Danio rerio</i>	<i>sox1a</i>	NM_001002483.2	320-1330
<i>Maylandia zebra</i>	<i>sox1a</i>	XM_004551260.2	331-1194

<i>Oryzias latipes</i>	<i>sox1a</i>	NM_001164865.1	1-969
<i>Danio rerio</i>	<i>sox1b</i>	NM_001037662.1	236-1258
<i>Oryzias latipes</i>	<i>sox1b</i>	XM_023966307.1	220-1251
<i>Amblyraja radiata</i>	<i>sox2</i>	XM_033032159.1	369-1091
<i>Callorhinchus milii</i>	<i>sox2</i>	XM_007907767.1	77-1012
<i>Chiloscyllium plagiosum</i>	<i>sox2</i>	CM012968.1	50331561-50334185
<i>Chiloscyllium punctatum</i>	<i>sox2</i>	BEZZ01000024.1	5715351-5716271
<i>Danio rerio</i>	<i>sox2</i>	NM_213118.1	224-1171
<i>Erpetoichthys calabaricus</i>	<i>sox2</i>	XM_028794611.1	306-1253
<i>Gallus gallus</i>	<i>sox2</i>	NM_205188.2	74-1012
<i>Geotrypetes seraphini</i>	<i>sox2</i>	XM_033957568.1	288-1229
<i>Homo sapiens</i>	<i>sox2</i>	NM_003106.4	437-1390
<i>Hydrolagus affinis</i>	<i>sox2</i>	JAAILG010087923.1	1-1711
<i>Lepisosteus oculatus</i>	<i>sox2</i>	XM_015360888.1	496-1443
<i>Maylandia zebra</i>	<i>sox2</i>	XM_004562078.2	244-1206
<i>Oryzias latipes</i>	<i>sox2</i>	NM_001278881.1	1-969
<i>Podarcis muralis</i>	<i>sox2</i>	XM_028731643.1	699-1673
<i>Pristis pectinata</i>	<i>sox2</i>	CM019860.1	91272862-91275486
<i>Scyliorhinus torazame</i>	<i>sox2</i>	BFAA01003007.1	203443-204375
<i>Amblyraja radiata</i>	<i>sox3</i>	XM_033030296.1	307-1227
<i>Callorhinchus milii</i>	<i>sox3</i>	XM_007892868.1	27-983
<i>Chiloscyllium plagiosum</i>	<i>sox3</i>	CM012970.1	77429639-77432263
<i>Chiloscyllium punctatum</i>	<i>sox3</i>	BEZZ01000333.1	1812549-1813827

<i>Danio rerio</i>	<i>sox3</i>	NM_001001811.2	190-1092
<i>Erpetoichthys calabaricus</i>	<i>sox3</i>	XM_028815815.1	379-1299
<i>Gallus gallus</i>	<i>sox3</i>	NM_204195.1	191-1141
<i>Geotrypetes seraphini</i>	<i>sox3</i>	XM_033947002.1	46-957
<i>Homo sapiens</i>	<i>sox3</i>	NM_005634.3	10-1350
<i>Hydrolagus affinis</i>	<i>sox3</i>	JAAILG010039076.1	3-2152
<i>Lepisosteus oculatus</i>	<i>sox3</i>	XM_006632889.2	239-1156
<i>Maylandia zebra</i>	<i>sox3</i>	XM_014412645.3	341-1243
<i>Oryzias latipes</i>	<i>sox3</i>	NM_001104764.1	192-1094
<i>Podarcis muralis</i>	<i>sox3</i>	XM_028715451.1	159-1157
<i>Pristis pectinata</i>	<i>sox3</i>	CM019862.1	99818616-99821240
<i>Scyliorhinus torazame</i>	<i>sox3</i>	BFAA01003357.1	155304-156209
<i>Petromyzon marinus</i>	<i>soxB1</i>	XM_032977917.1	491-1852
<i>Saccoglossus kowalevskii</i>	<i>soxB1</i>	NM_001164905.1	129-1079
<i>Strongylocentrotus purpuratus</i>	<i>soxB1</i>	NM_214474.1	35-1069
<i>Branchiostoma floridae</i>	<i>soxB1a</i>	XM_035812966.1	109-846
<i>Branchiostoma floridae</i>	<i>soxB1b</i>	XM_035812932.1	94-1026
<i>Branchiostoma floridae</i>	<i>soxB1c</i>	XM_035836878.1	194-1162

Table S4. GenBank numbers and region encoding *sox15* HMG box used in this study

Species	Genbank	The region encoding <i>sox15</i> HMG box
<i>Actinemys marmorata</i>	VOGN01103132.1	124-348
<i>Bos taurus</i>	NM_001192075.2	383-607
<i>Canis lupus familiaris</i>	XM_003434613.4	575-799
<i>Carettochelys insculpta</i>	VOCQ01049897.1	838-1062
<i>Chrysemys picta bellii</i>	XM_005313716.3	221-445
<i>Crotalus horridus</i>	LVCR01002573.1	46517-46293
<i>Crotalus pyrrhus</i>	JPMF01386956.1	2217-2002
<i>Cuora mccordi</i>	RQSS01058433.1	365-141
<i>Dermochelys coriacea</i>	CM019962.1	1073176-1072952
<i>Emydura subglobosa</i>	ML679986.1	14494360-14494584
<i>Gopherus agassizii</i>	PPEB01019908.1	2333-2109
<i>Gopherus evgoodei</i>	XM_030548210.1	242-466
<i>Gymnobelideus leadbeateri</i>	WOXC01007257.1	60634-60813
<i>Homo sapiens</i>	NM_006942.2	563-787
<i>Lacerta agilis</i>	XM_033169758.1	130-354
<i>Lacerta bilineata</i>	OFHV01000405.1	156086-155862
<i>Lacerta viridis</i>	OFHU01000428.1	88450-88226
<i>Loxodonta africana</i>	XM_003416759.2	910-1134

<i>Malaclemys terrapin terrapin</i>	MDXI01008586.1	24716-24492
<i>Mesoclemmys tuberculata</i>	ML675649.1	49025559-49025335
<i>Mus musculus</i>	XM_021176175.1	475-699
<i>Orcinus orca</i>	XM_033422980.1	611-835
<i>Orycteropus afer afer</i>	XM_007952262.1	145-369
<i>Oryctolagus cuniculus</i>	XM_002718796.3	682-906
<i>Pantherophis guttatus</i>	XM_034407244.1	205-429
<i>Pantherophis obsoletus</i>	WJSR01035797.1	11747-11971
<i>Pelodiscus sinensis</i>	XM_014576967.2	856-1080
<i>Pelusios castaneus</i>	ML686008.1	478506-478282
<i>Phascolarctos cinereus</i>	XM_020966486.1	600-824
<i>Platysternon megacephalum</i>	QXTE01000496.1	81396-81620
<i>Podarcis muralis</i>	XM_028703808.1	189-413
<i>Podocnemis expansa</i>	ML682121.1	223254-223478
<i>Protobothrops mucrosquamatus</i>	NW_015389773.1	3941-4165
<i>Ptyas mucosa</i>	WNWU01000118.1	65233-65009
<i>Salvator merianae</i>	QVOM02000051.1	3178101-3177877
<i>Sarcophilus harrisii</i>	XM_003775309.4	588-812
<i>Terrapene carolina triunguis</i>	XM_029913060.1	166-390
<i>Thamnophis sirtalis</i>	NW_013660209.1	77487-77711
<i>Thermophis baileyi</i>	QLTV01003982.1	183788-183564
<i>Thylacinus cynocephalus</i>	VAHE01000497.1	1891437-1891661
<i>Trachemys scripta elegans</i>	XM_034756827.1	49-273

<i>Trichosurus vulpecula</i>	CM021911.1	260860768-260860992
<i>Vipera berus berus</i>	KN617096.1	121594-121818
<i>Vombatus ursinus</i>	XM_027857251.1	1634-1858
<i>Zootoca vivipara</i>	XM_035137001.1	148-372

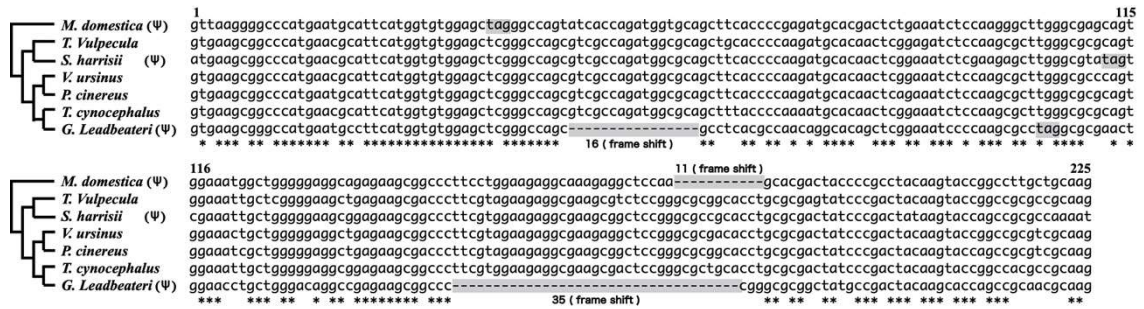
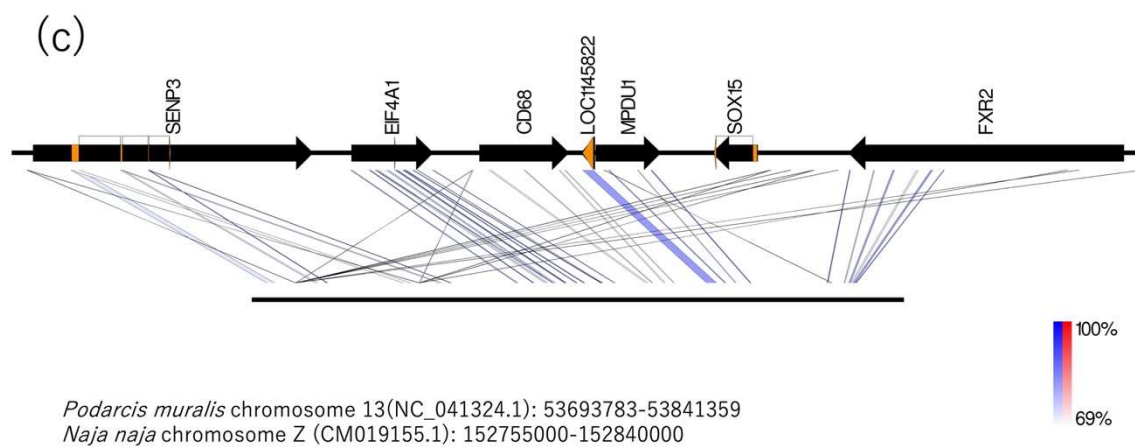
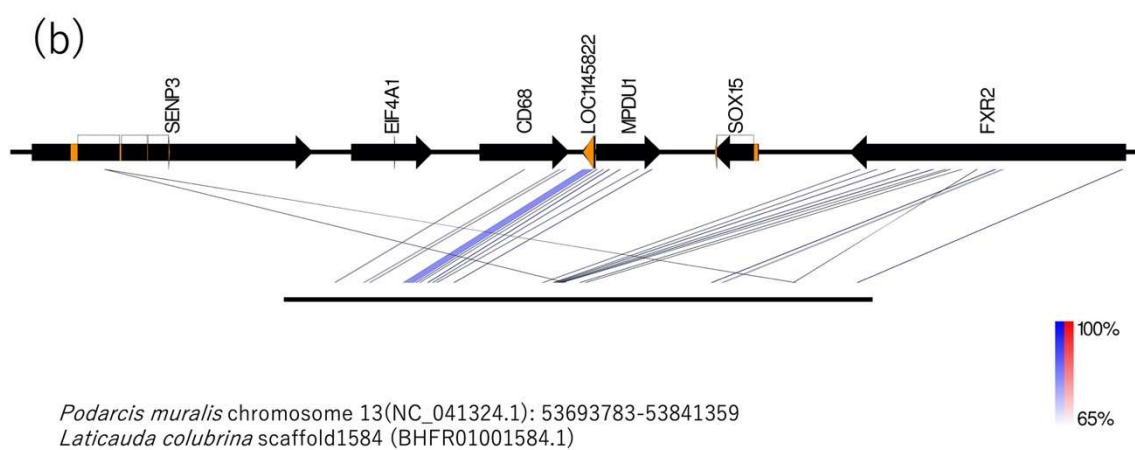
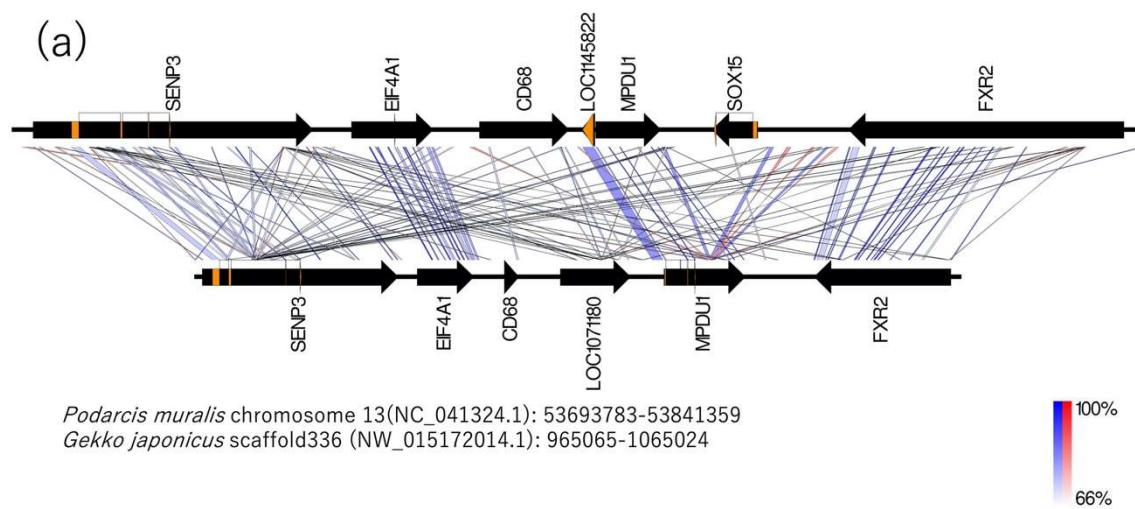


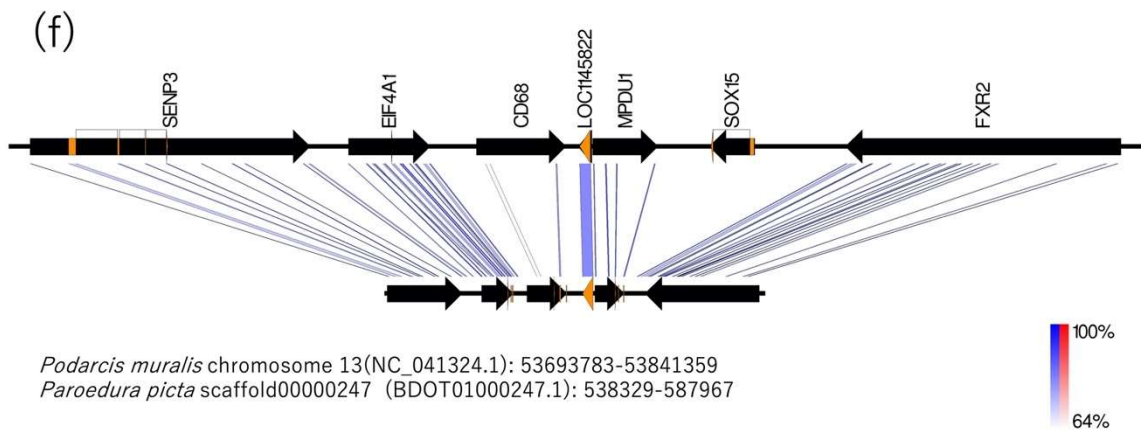
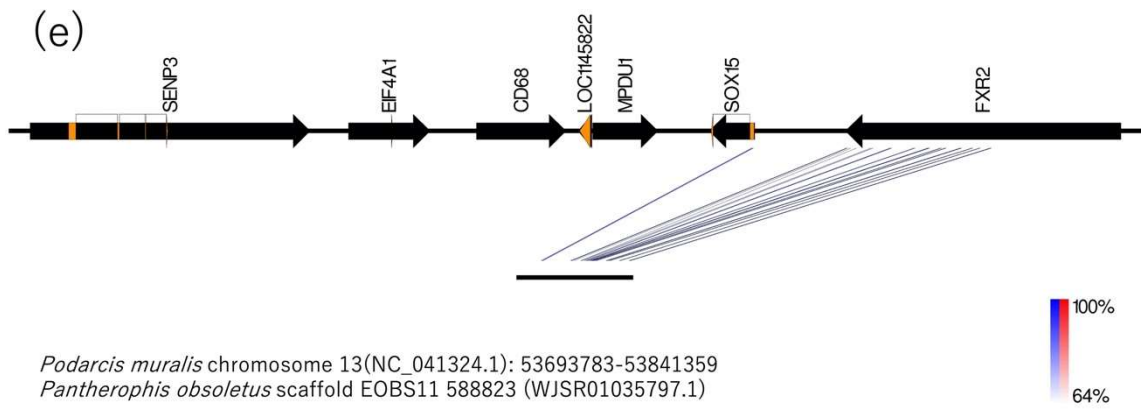
Figure S1. Multiple alignment of the HMG box-encoding nucleotide sequences of marsupial pseudogenized and non-pseudogenized.

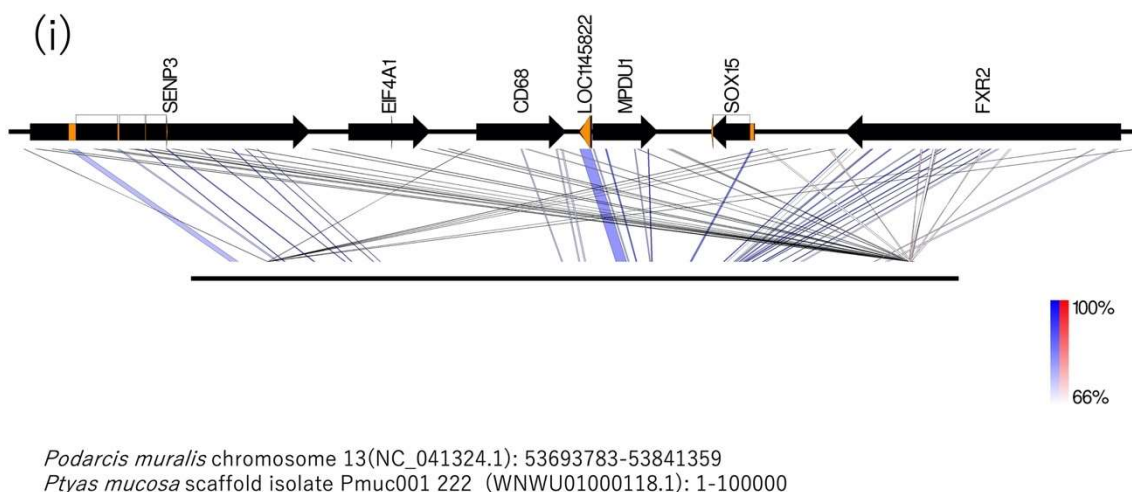
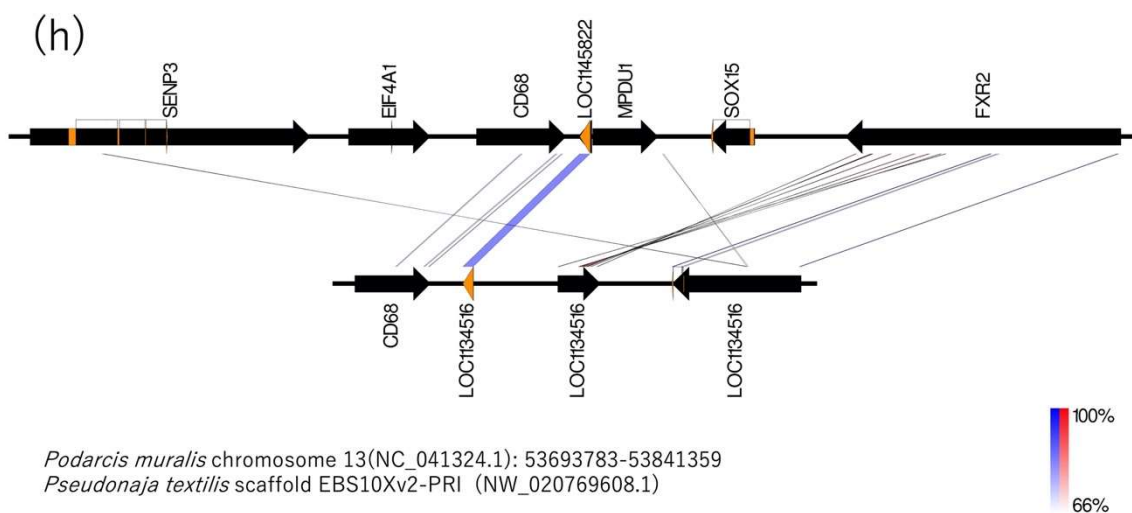
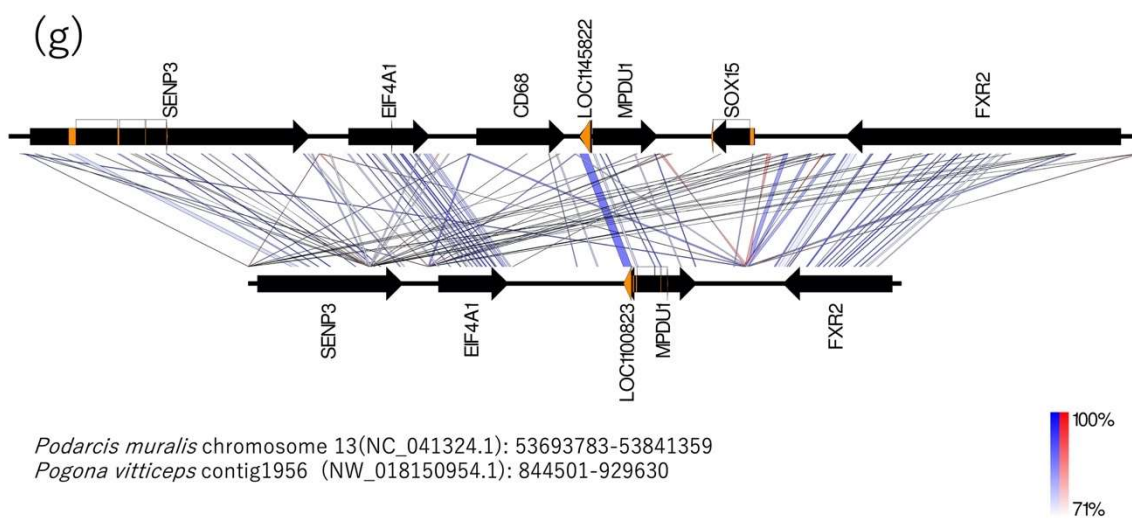
sox15 Independent pseudogenization of *sox15* during marsupial speciation. (Ψ) denotes the pseudogenization of *sox15* in the three species. Nucleotide sequences in the HMG box-coding region consisting of 225 nucleotides are shown in the alignment. In-frame stop codons and deletions with frameshift mutations are highlighted by gray boxes. Identical nucleotides among the seven species are indicated by asterisks in the alignment.

<i>Mus musculus</i>	1	MALTSSSQAETWSLHPRAST--SLPLGPQEAGGSPGASGGLPLEKVKRPMNAFMVWS	58
<i>Phascolarctos cinereus</i>	1	MALPRAPPLQAWALTFPAPTAFASSTSRPLDSE---SPGIPGEIP-TKVKRPMNAFMVWS	56
<i>Vombatus ursinus</i>	1	MALPRAPPLKAWALTLPAPTAFASSTSSPLESE---SPGIPGEIP-TKVKRPMNAFMVWS	56
		* * *	
		HMG box	
<i>Mus musculus</i>	59	SVQRROMAQONPKMHNSEISKRLGAQWKLLGDEEKRPFVEEAKRLRARHLRDYDPKYRP	118
<i>Phascolarctos cinereus</i>	57	SGQRROMAQLHPKMHNSEISKRLGAQWKS LGAEKRPFVEEAKRLRARHLRDYDPKYQP	116
<i>Vombatus ursinus</i>	57	SGQRROMAQLHPKMHNSEISKRLGAQWKL LGAEKRPFVEEAKRLRARHLRDYDPKYRP	116
		* . * * * * * * * *	
<i>Mus musculus</i>	119	RRKSNSTGSVPFSQEGGLA---CGSHWG--PGYTQTQS RGFYGYPNYSAYLPG	173
<i>Phascolarctos cinereus</i>	117	RRKAKNTDLG----HEGLELAKASNSSNHGAEPVW----GTGGFGYQ-PHYSSSYLA E	166
<i>Vombatus ursinus</i>	117	RRKAKNTNLG----HEGLGLARASKGSSNHGAEPGW----GTRGFYG Y-PHYSSSYLA E	166
		* * . * * * *	
<i>Mus musculus</i>	174	SYTSSHCRPEAPLPCTFPQSDPRLQGELRPSFSPYLSPDSSTPYNTSLAGAMPVTHL--	231
<i>Phascolarctos cinereus</i>	167	DCGAHHWKPEALSFC SLPLGAP-LQGELLNPYNPY-SP-GPTSYPNALLG-PTP-----	216
<i>Vombatus ursinus</i>	167	DCGVHHSKPEALSFC SLPLAAP-FQGELLNPYNPY-SP-GPTSYPNALLG-PTPRSTSN N	222
		. . . * . * * . . . * . . * * * . . . * . . . *	
<i>Mus musculus</i>	----		231
<i>Phascolarctos cinereus</i>	----		216
<i>Vombatus ursinus</i>	223	PRAQGP	222

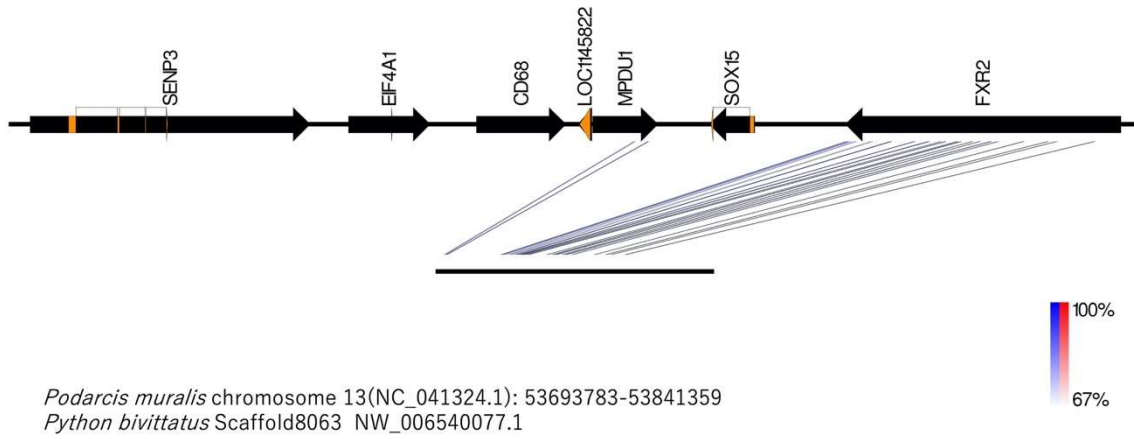
Amino acid sequences of SOX15 from the two marsupial species and eutherian mouse *Mus musculus* were aligned by MAFFT version 7.427 and compared by genetics MAC ver 18. Asterisks indicate identical amino acids between the three proteins. SOX15 from the two marsupials had open reading frames consisting of 216 and 229 amino acid residues, which showed no evidence of pseudogenization.



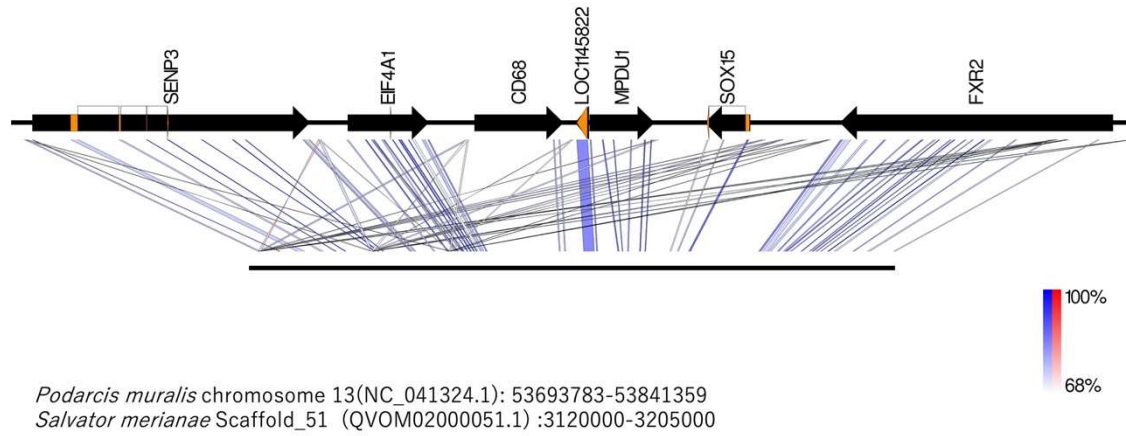




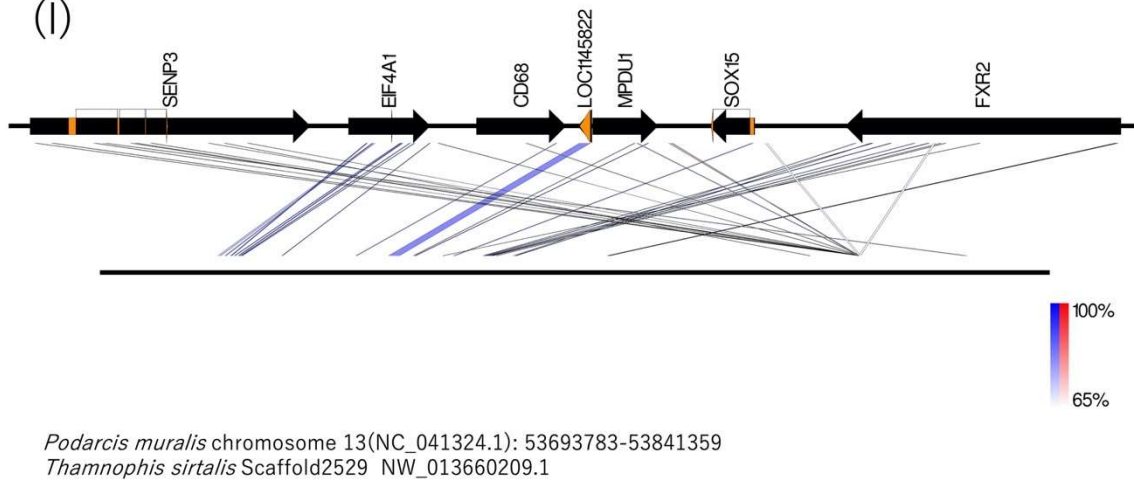
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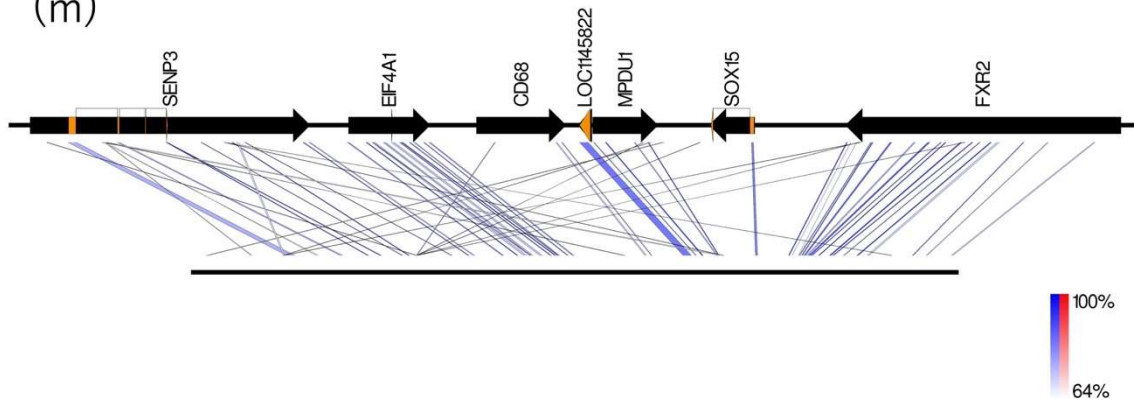
(k)



(l)

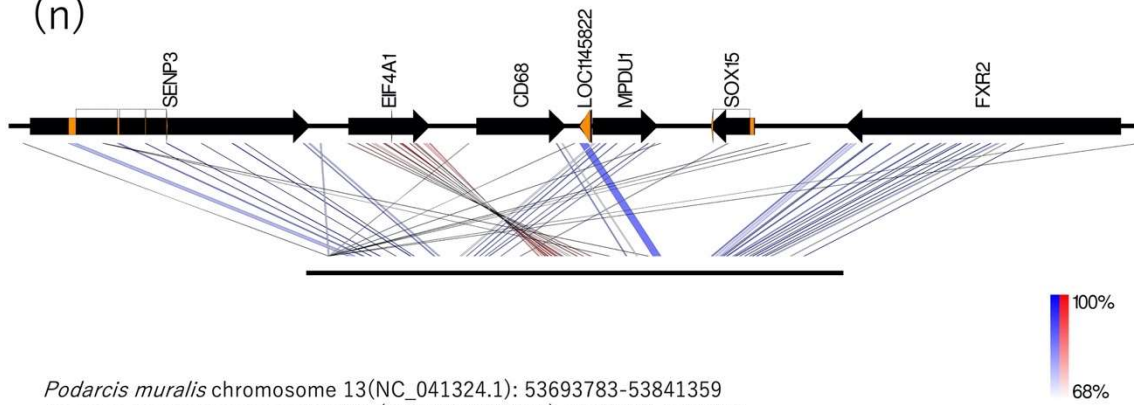


(m)



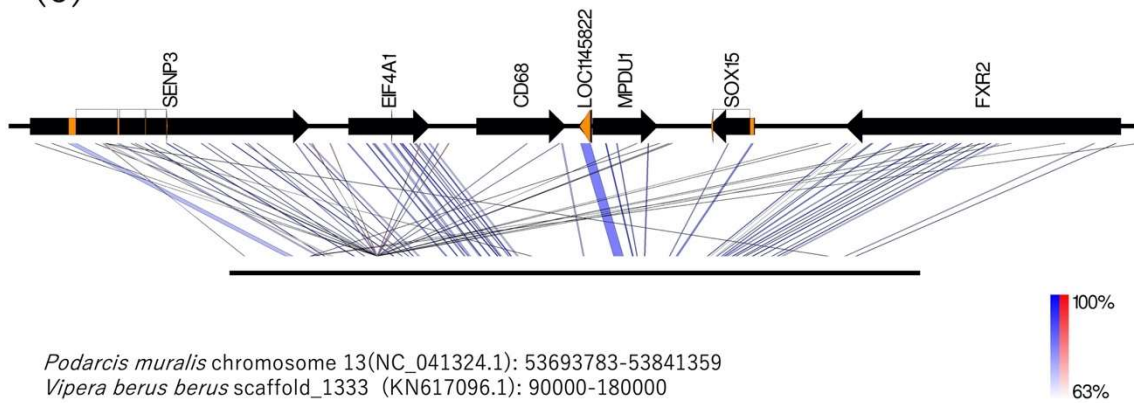
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Thermophis baileyi scaffold753 (QLTV01003982.1) :110001-210000

(n)

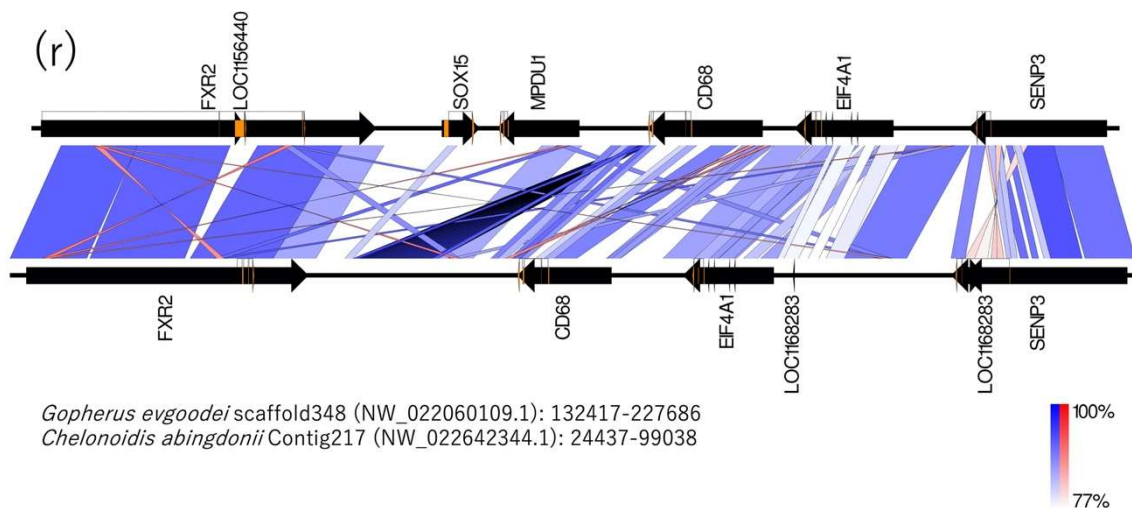
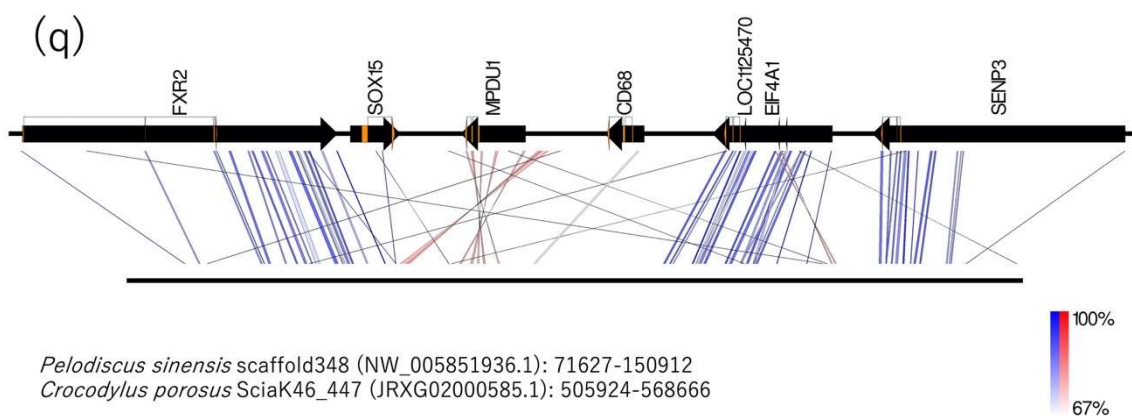
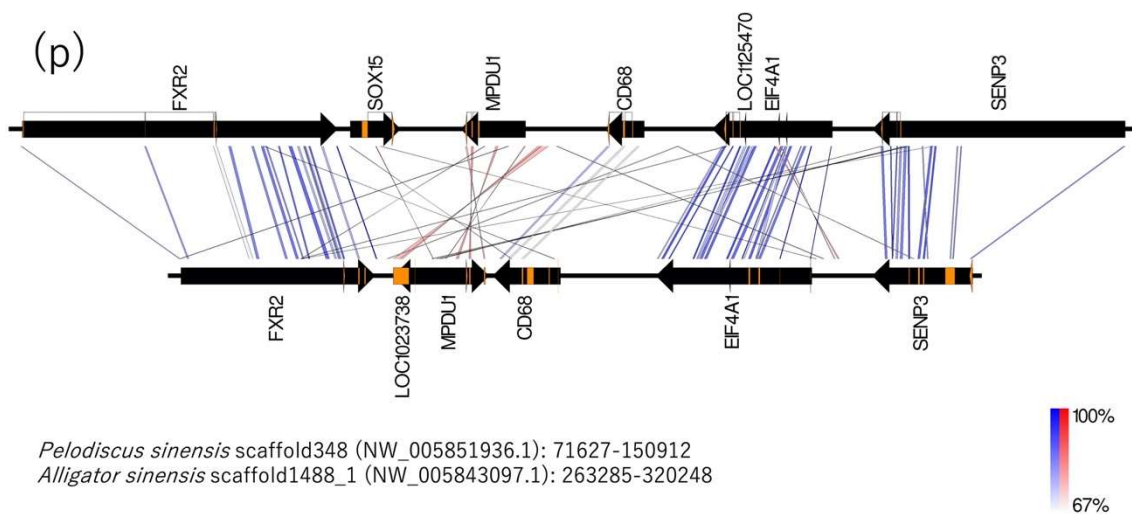


Podarcis muralis chromosome 13(NC_041324.1): 53693783-53841359
Varanus komodoensis scaffold87 (SJPD01000099.1) :1520000-1590000

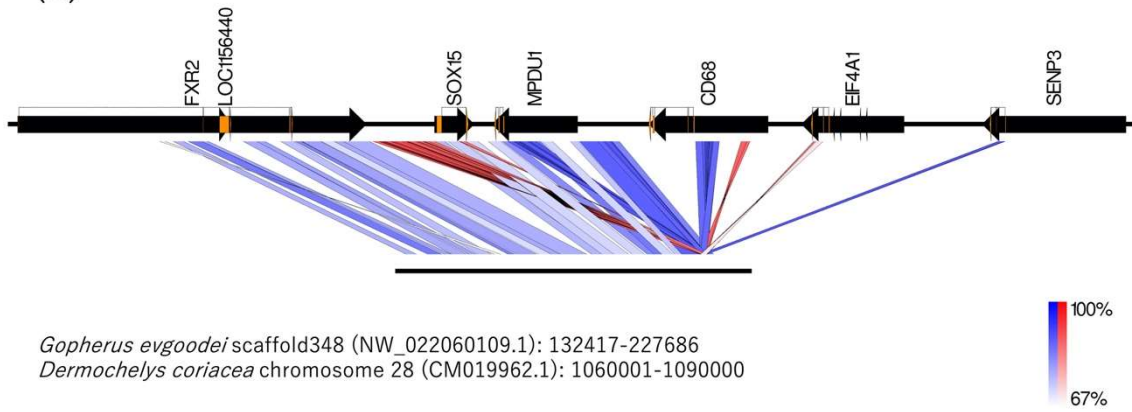
(o)



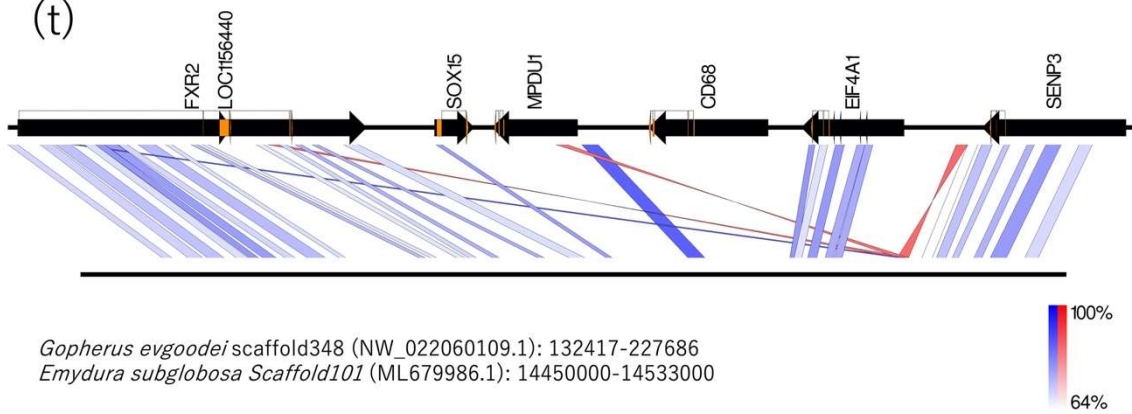
Podarcis muralis chromosome 13(NC_041324.1): 53693783-53841359
Vipera berus berus scaffold_1333 (KN617096.1): 90000-180000



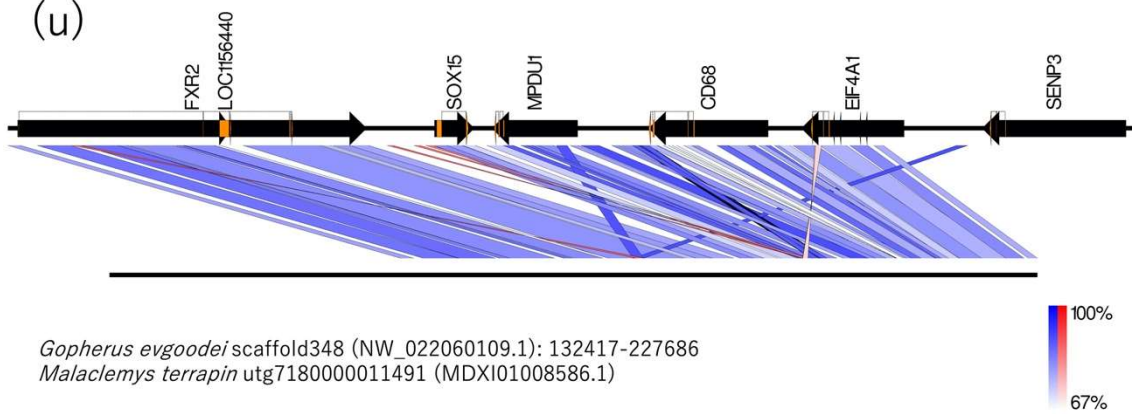
(s)



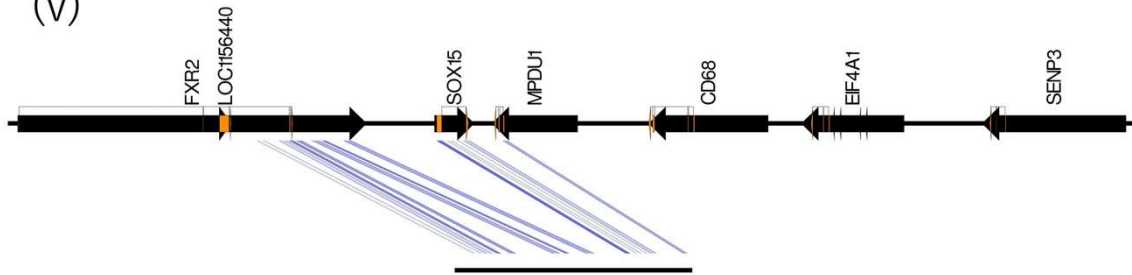
(t)



(u)

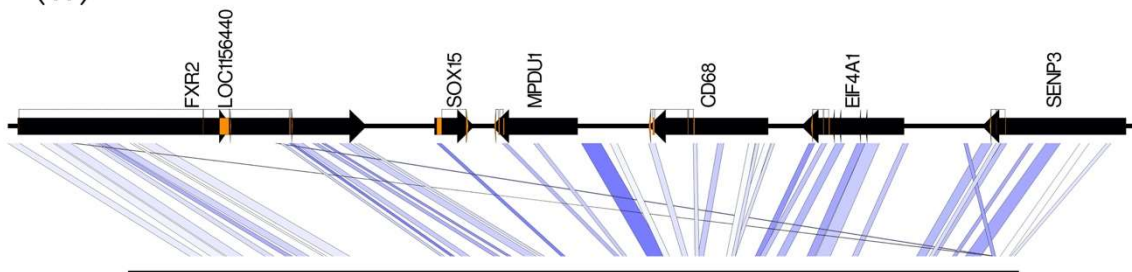


(v)



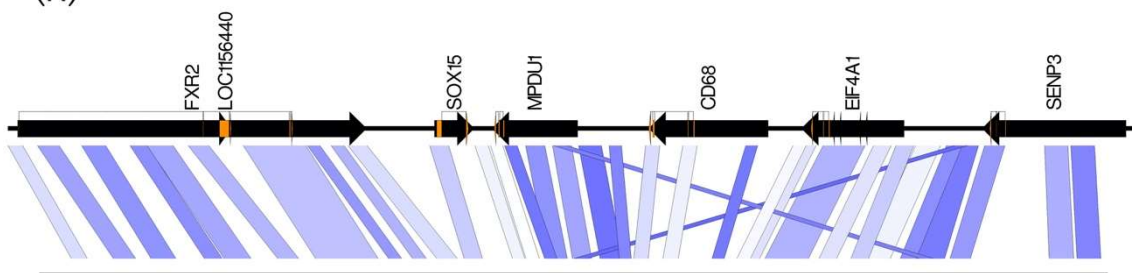
Gopherus evgoodei scaffold348 (NW_022060109.1): 132417-227686
Mesoclemmys tuberculata Scaffold89 (CM019962.1): 1060001-1090000

(w)



Gopherus evgoodei scaffold348 (NW_022060109.1): 132417-227686
Pelusios castaneus Scaffold366 (ML686008.1): 440001-515000

(x)



Gopherus evgoodei scaffold348 (NW_022060109.1): 132417-227686
Platysternon megacephalum scf496 (QXTE01000496.1): 45001-135000

(y)

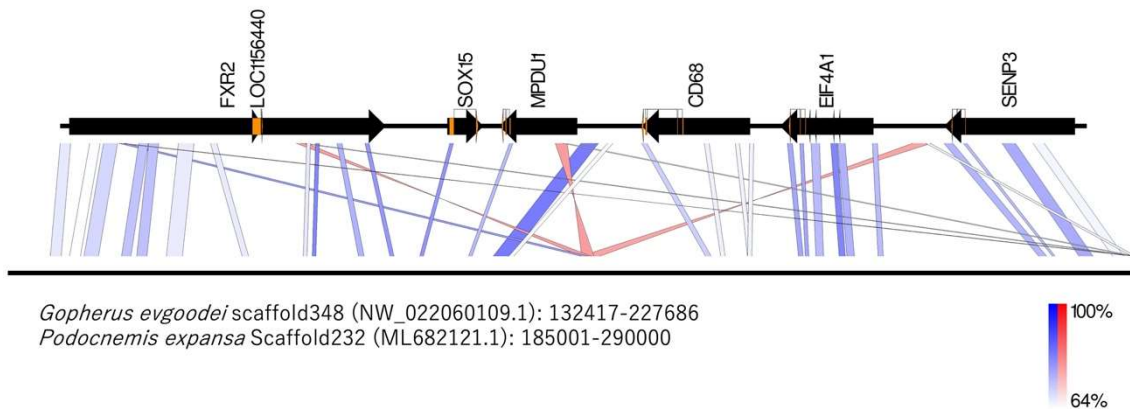


Figure S3. Easyfig analysis for the locus encoding *fxr2* and *mpdu1* genes in reptiles.

(a-o) Loci encoding *fxr2* and *mpdu1* in squamata were compared to those of *Podarcis muralis* by blastn in default options. (p, q) Loci encoding *fxr2* and *mpdu1* in crocodilia were compared to those of *Pelodiscus sinensis* by blastn in default options. (r-y) Loci encoding *fxr2* and *mpdu1* in crocodilia were compared to that of *Pelodiscus sinensis* by blastn in default options without the hit length limited to (v, w, y) 300, (r-u) 500, and (x) 1000 or more. The blastn results were visualized by Easyfig 2.2.2 with blue and red lines, which indicate the forward and reverse blastn hits. Color scale indicates identity percentage of the hits. Black arrows show regions and directions of genes. Orange boxes show exon regions of the gene.

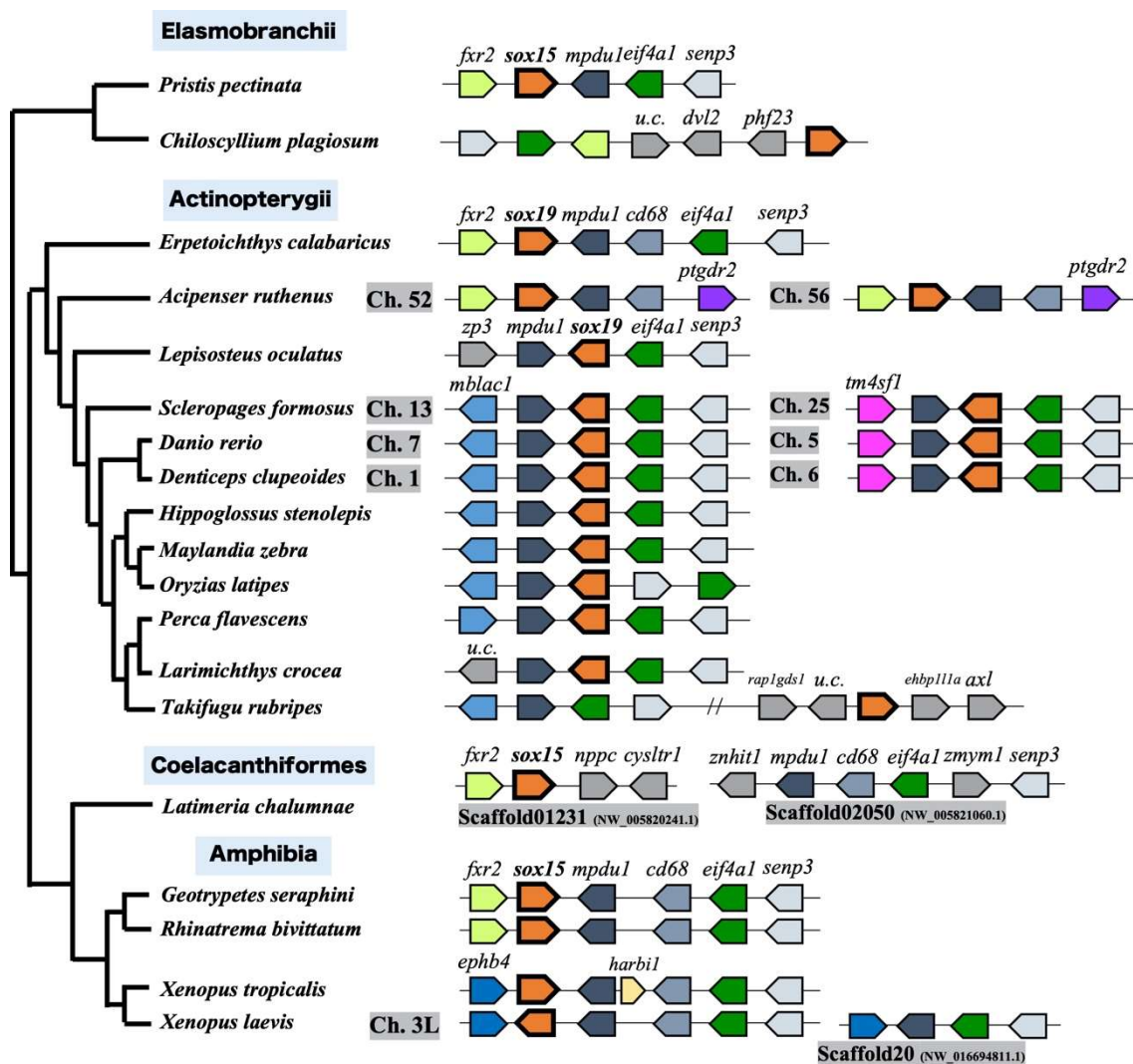


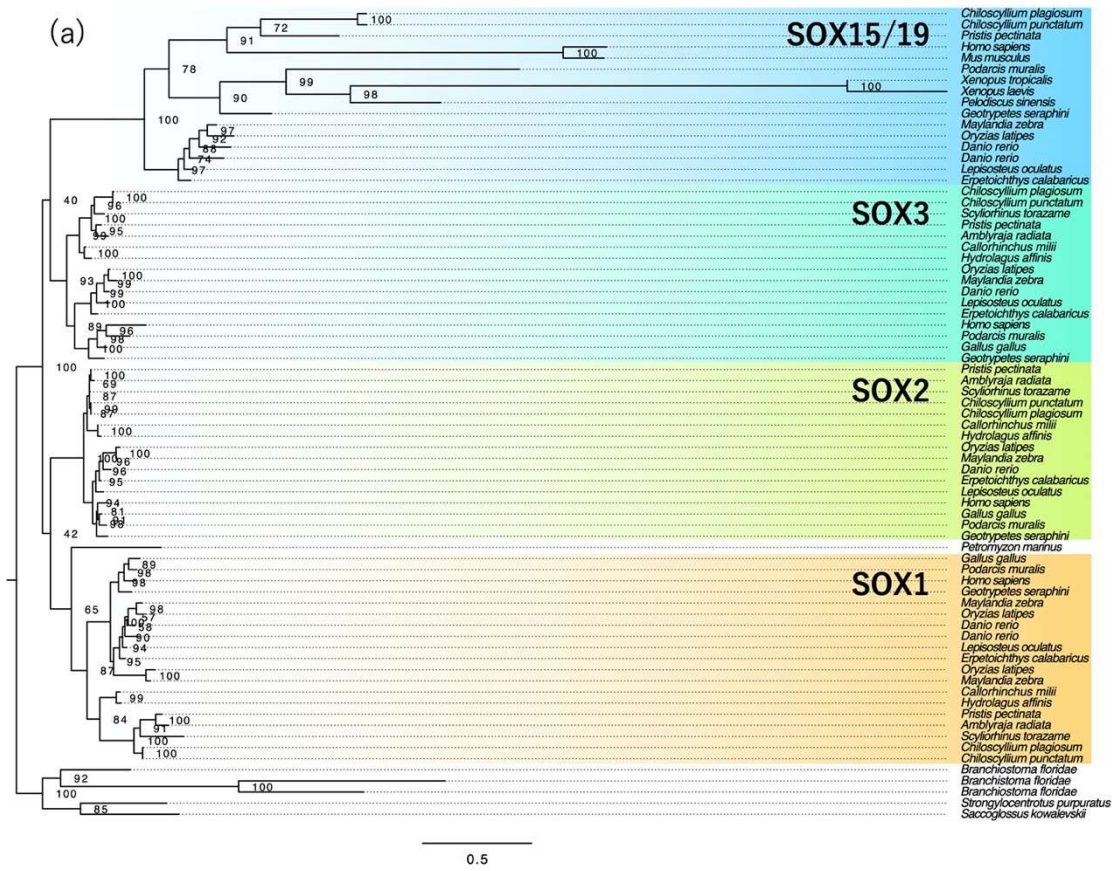
Figure S4. Summary of syntenic analysis of *sox15* in vertebrates

u. c., a gene encoding uncharacterized protein

Score	E value	Identities	Gaps	Strand
1373.65 (1522)	0.00 × 10+00	797/823 (96.84)	21/823 (2.55)	+/+
Query 18	GTCCCGGGGCCAGAGGCGGAAGATGGCACAGGATCATCCCAAGATGCACAACCTCGGAGAT	77		
Subject 1	GTCCCGGGGCCAGAGGCGGAAGATGGCACAGGATCATCCCAAGATGCACAACCTCGGAGAT	60		
Query 78	CAGCAAGAGGCTGGGCGCCGAGTGGAAGCTGCTCGGCGACGCCGACAAGCGCCCGTTTCAT	137		
Subject 61	CAGCAAGAGGCTGGGCGCCGAGTGGAAGCTGCTCGGCGACGCCGACAAGCGCCCGTTTCAT	120		
Query 138	CGACGAGGCCAAGAGGCTGCGCGCCGTGCACATGAAGGACTACCCGGACTACAAGTACCG	197		
Subject 121	CGACGAGGCCAAGAGGCTGCGCGCCGTGCACATGAAGGACTACCCGGACTACAAGTACCG	180		
Query 198	CCCGCGGAGGAAGAGCAAGGCGCTGCCAGGAAGGACGGCAGTTCTCGCTGGCGGCGGC	257		
Subject 181	CCCGCGGAGGAAGAGCAAGGCGCTGCCAGGAAGGACGGCAGTTCTCGCTGGCGGCGGC	240		
Query 258	GGCGGCAGGACCCAGCGGAAGCCCGTACCTCTGGGGGGCGGGGCTGGGGCGTTCTGAC	317		
Subject 241	GGCGGCAGGACCCAGCGGAAGCCCGTACCTCTGGGGGGCGGGGCTGGGGCGTTCTGAC	300		
Query 318	CCCTGACCCGCTGCCGCCCGCATGCGCAGCGGGAGGGGGCTACCCGACGGCCGAGGCGTC	377		
Subject 301	CCCTGACCCGCTGCCGCCCGCATGCGCAGCGGGAGGGGGCTACCCGACGGCCGAGGCGTC	360		
Query 378	GCTGGCGCAGGCGCAGAGCTGCCCCAGGCGGCGGCCCTCCTCCTCCTCCTCCCC	437		
Subject 361	GCTGGCGCAGGCGCAGAGCTGCCCCAGGCGGCGGCCG-----CCTCCTCCTCCCC	411		
Query 438	TCAGGCCCCGTACCCGCCGCTGCAGCCGCGTACGAACTGCCGTACGCCGCCGCTCCTC	497		
Subject 412	TCAGGCCCCGTACCCGCCGCTGCAGCCGCGTACGAACTGCCGTACGCCGCCGCTCATC	471		
Query 498	ATCATCA-----TCATCGTCTTCTTCTGTCGTCTCCCGCCCTCCAGGCCTACCTGAC	551		
Subject 472	ATCATCATCGTCTTCTGTCGTCTGTCGTCTCCCGCCCTCCAGGCCTACCTGAC	531		
Query 552	CGGCTCGTCGTCCGTCTACAGCCTCGCC-----CCGCCGCCGCTTCCGCTACGGCCG	605		
Subject 532	CGGCTCGTCGTCCGTCTACAGCCTCGCCCCGCCGCCGCCGCTTCCGCTACGGCCG	591		
Query 606	CCATCTCCACCAGCCGCGTCCGCCATGTCCAAGCGGCGCGGCACTGGCGGCGCGCA	665		
Subject 592	CCATCTCCACCAGCCGCGTCCGCCATGTCCAAGCGGCGCGGCACTGGCGGCGCGCA	651		
Query 666	GGCGCGGGGGCCCTGCCGGGGAATTCGAGACATGCTCAGTCTGTACATCCCGGCGCA	725		
Subject 652	GGCGCGGGGGCCCTGCCGGGGAATTCGAGACATGCTCAGTCTGTACATCCCGGCGCA	711		
Query 726	CGGCAGCCAGGAGCGCTGCTGGGTACAGGAGCTACCACCCATCCCTCAACACTACCA	785		
Subject 712	CGGCAGCCAGGAGCGCTGCTGGGTACAGGAGCTACCACCCATCCCTCAACACTACCA	771		
Query 786	GAACATGCCCTGAATGGTACATTGCCCTCACCCACATCTGA	828		
Subject 772	GAACATGCCCTGAATGGTACACTGCCCTCACCCACATCTGA	814		

Figure S5. An intron-less structure of *Chiloscyllium punctatum* ortholog of *sox15* by blastn hit.

Annotated open reading frame of *C. punctatum* ortholog of *sox15* (BEZZ01008499.1:3-830) was used for a blastn search as a query for a database “Chiloscyllium punctatum transcript contigs” (<https://transcriptome.riken.jp/squalomix/blast/>). “Query” was the query sequence used. “Subject” was a top hit contig “PE_TRINITY_DN183021_c7_g3_i2”.



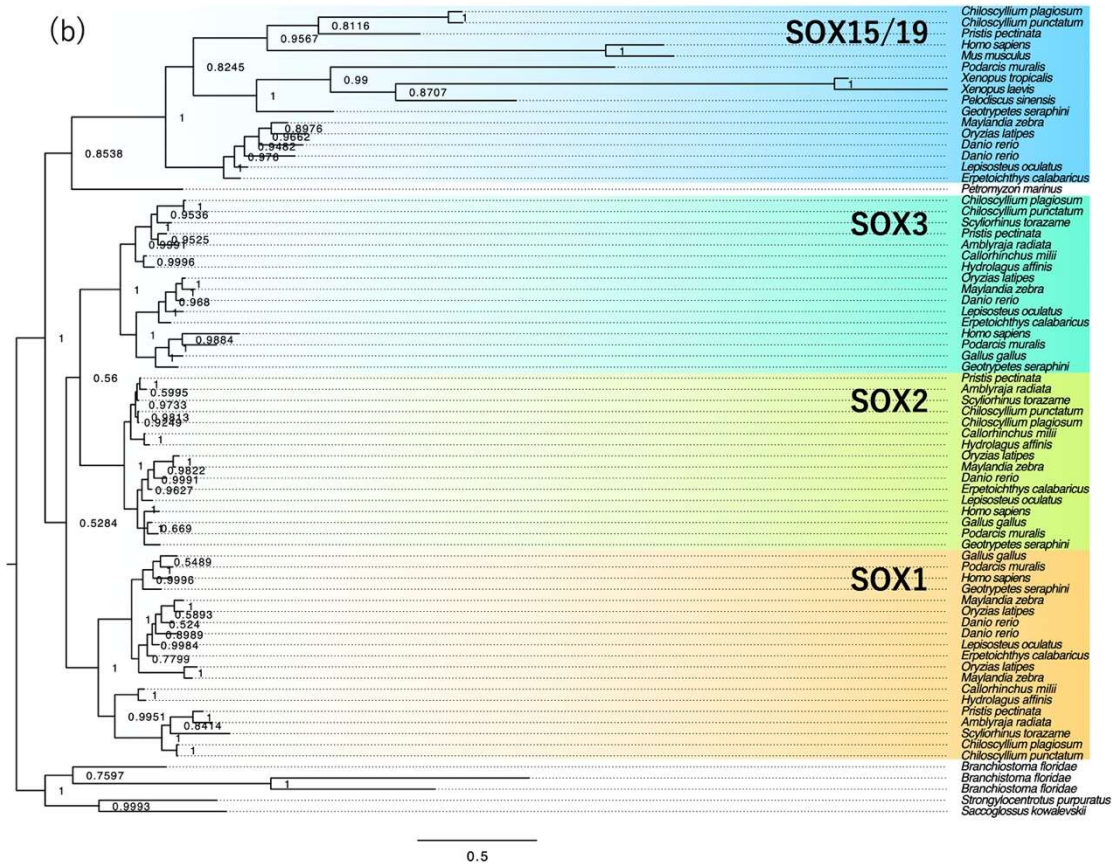


Figure S6. Phylogenetic trees of four *soxB1/G* ohnologous proteins.

A total of 73 sequences with 287 amino acid sites were used for the tree inference. **(a)** Maximum likelihood tree of amino acid (aa) sequences encoded by *soxB1/G* ohnologs. The JTT + F + I + Γ 4 model was selected as the best-fit model in this dataset and used for this tree inference. Ultrafast bootstrap values 1000 times are shown to each node. **(b)** Bayesian tree of aa sequences encoded by *soxB1/G* ohnologs. A mixed model was used as the aa substitution model for this tree inference. Bayesian posterior probabilities are shown for each node.

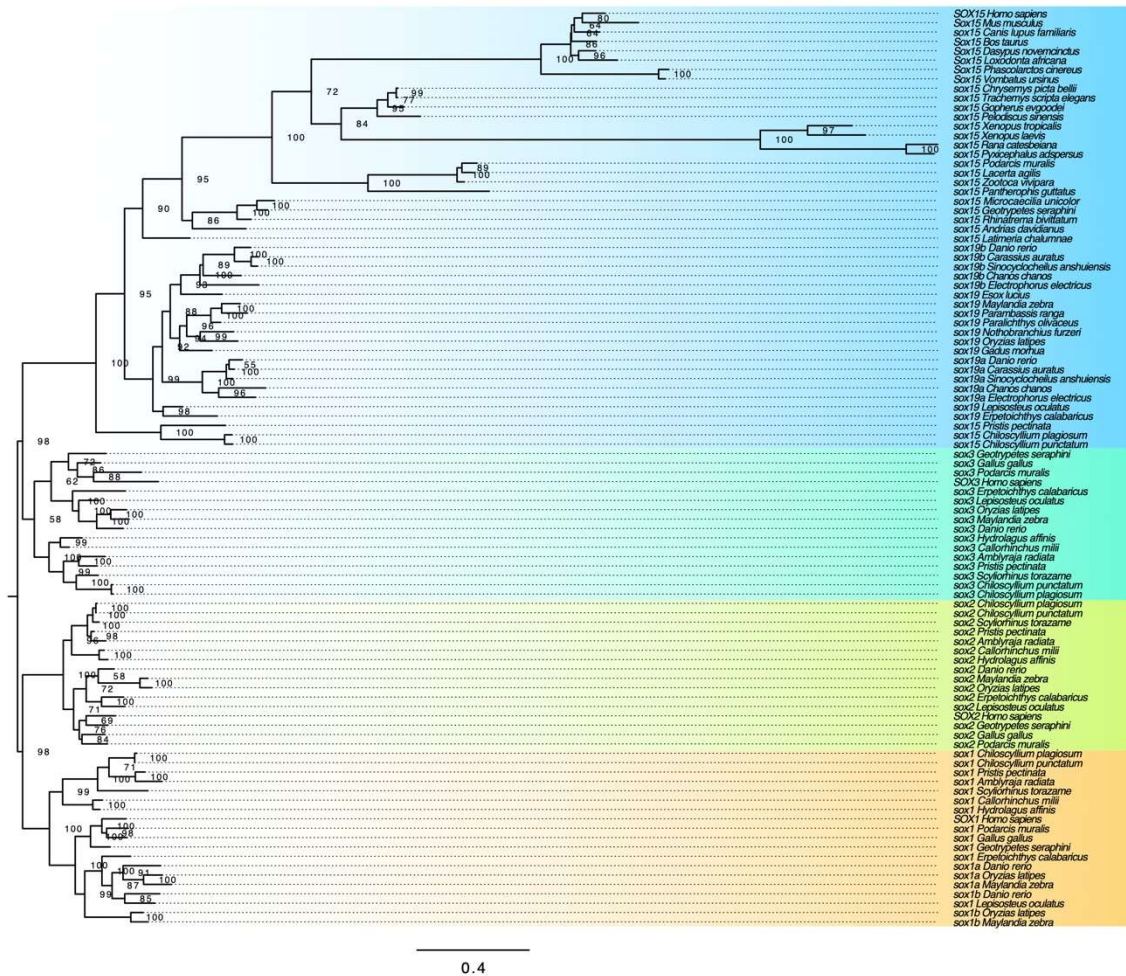


Figure S7. Maximum likelihood tree of nucleotide sequences of gnathostomata *soxB1/G* ohnologs.

A total of 98 sequences with 831 nucleotide sites were used for this tree inference. The GTR + F + R5 model was selected as the best-fit model in this dataset and used for this tree inference. Ultrafast bootstrap values 1000 times are shown for each node.

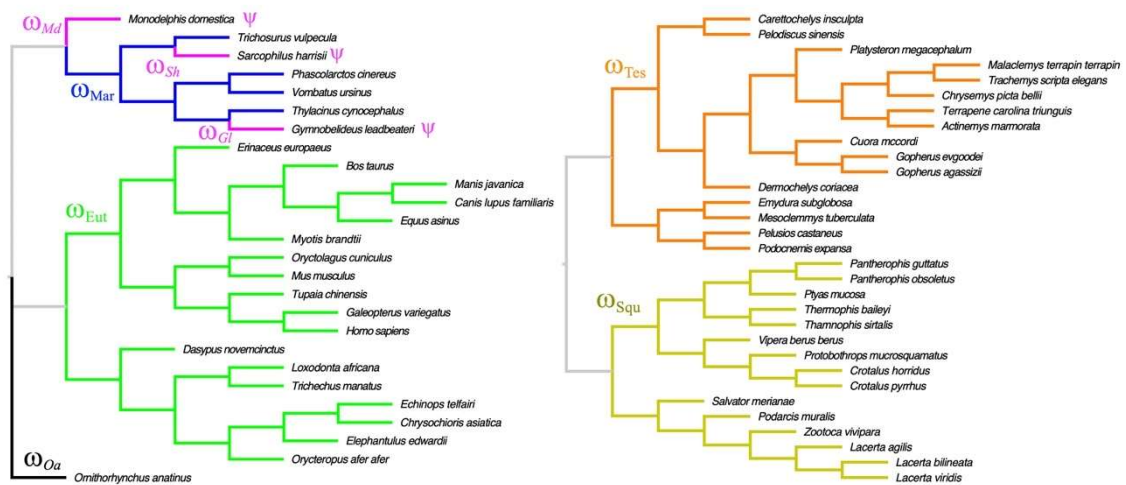


Figure S8. Species trees of mammals and reptiles used for the codeml and RELAX analysis.

Species trees of mammals (left) and reptiles (right) are colored based on phylogeny. Marsupial species with *sox15* pseudogenes are denoted by “ ψ ”.

(a)

>C_plagiosum_sox1

MYSMMEGELQSPGPVSA---PVPAGGTNGKVSGERVKRPMNAFMVWSRGQRRKMAQENPK
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SLPAGLLSPGPGALSSPGLNQRLDGYAHMNGWANGAYVMMQDPLAYSQHPALAAHHPQQL
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SGDLREMISMYLPGGEAGDPS-QNRLLLAQHYQSPTAVNGTIPLTHM

>C_plagiosum_sox2

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HRYDMSALQYNSMTSAQTYMNGSPTYSMSPYTQQGTSMGSVVKSESSTSPVTTTHSRPPC
QGDLRDMISMYLPGA EVPEPTAQSR LHMPQHYSATGINGTLPLTHM

>C_plagiosum_sox3

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LGDLRDMISMYLPGGDAGDPSASSRLHVHQHYQNSTGVSSTVPLTHI

>C_plagiosum_sox15

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PRYELPYAAASP--PSQAYLNGSTSYSLAPHLHQP--SAMSKPA-----AGAQARGAL
PGELRDMLSLYIP-SDGSEALGHRSYHIPQHYN-MPLNGTVPLTHI

>P_pectinata_sox1

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SLPAALLPQGPALGPVGLNQRLDGYGHMNGWANGSYVMMQEQLSYTQHPALAAHHSQQL
HRYDMP-IQYSPLPGTQGYMSGSPSYTLSSYSHQPPQLGSMVKSEPAPSPPVSSHSPPC
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>P_pectinata_sox2

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HRYDMSALQYNSMTSAQTYMNGSPTYSMSPYTQQTSMGSVVKSESSTSPVTTTHSRPPC

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>P_pectinata_sox3

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>P_pectinata_sox15

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PRYE---LQYPP--ASQYPYAGSSPYSLPPYRPPA---SLPKSEVS-----ATHAQGAP
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>sox1_Homo_sapiens

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>sox1_Podarcis_muralis

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>sox1_Erpetoichthys_calabaricus

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>Danio_erio_sox1a

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>Danio_erio_sox1b

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>sox2_Danio_erio

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>sox3_Danio_erio

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>sox19a_Danio_erio

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>sox19b_Danio_erio

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>sox2_Homo_sapiens

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>sox2_Gallus_gallus

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HRYDVSALQYNSMTSSQTYMNGSPTYSMS-YSQQGTSMGSVVKTESSSSPPVSSHRSR-PC
QGDLRDMISMYLPGA EVPEPAAPSRLHMSQHYQSATAINGTLPLSHM

>sox2_Podarcis_muralis

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>sox2_Erpetoichthys_calabaricus

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>sox3_Homo_sapiens

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>sox3_Gallus_gallus

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LGDLRDMISMYLPGGDATDPSAGSRLHVHQHYQSATAVNGTVPLTHI

>sox3_Podarcis_muralis

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LGDLRDMISMYLPGGDAADPSTGTRLHVHQHYPSATAVNGTVPLTHI

>sox3_Erpetoichthys_calabaricus

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HRYEMAGLQYNPMSTAQTYMNAASTYTMSPYTQQTASMASVCKSEASSPPITSHSQRAC
LGDLRDMISMYLPGGDGADHSSTSRLLHVHQHYQTATGVNATLPLTHI

>sox19_Erpetoichthys_calabaricus

MYSMMEHEIKSTGPPPHQHGGTKGTCPPGGDPMDKVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGAEWKLLTDAEKRPFIDEAKRLRALHMKKEYPDYKYRPRRKNKPLLKKDKY
PLSAGNLLAAAAAQGP-GGSPRMDSY---GWPTGGYAGMQSALGYT-----QQL
HRYDLSALQYPPMAPSQTYMNGANSYSMSYSAQQASSVMSMVKPEPVSHSPTPSHHRGGL
QGDLRDMISMYIPSNDTADPSGQRGYAVQQHY----LNGTVPLTHI

>sox15_Homo_sapiens

MALSLEPPAATAAPQERE--GAGSPAAPGTLPLEKVKRPMNAFMVWSSAQRRQMAQQNPK
MHNSEISKRLGAQWKLLDEDEKRPFVEEAKRLRARHLRDYPDYKYRPRRKAKSSGAGPRC
GQGRGNLA-SGGPL-----W--GYATTQPRGGYR-----
-----PP-SYSTAYLPGS--YSSHCKLEAPS--CSLPQSD-----PRL
QGELLPTYTHYLPGSP--TP-----YNPP--AGAPMPLTHL

>sox15_Podarcis_muralis

MFTVFPAE----PLQQEPGRALPPPPAPEDPLEKVKRPMNAFMVWSSAQRRKMAQEHPK
MHNSEISKRLGAAWKLLPDAAEKRPFVDEAKRLRALHMKDYPDYKYRPRRKGGSGRARDK-
GAPAAAASPGTFPCAP-----AETRAW-----AYAASPGGT-DGRGAC
YPYELA---GPGGGGGGYGAGSPAYTLT-YGAQPSVMTTMIKQEGGLQQF---HHS---
-GDFHDVMTAYSLACDAAEGAP--QYCSQHPY---LGFSNTPPLTHL

>sox1_Geotrypetes_seraphini

MYSMMETDLHSPGGQPPSNTAGAGGGGGGKSNQDRVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGAEWKVMSEAEKRPFIDEAKRLRALHMKHEPDYKYRPRRKTCTLLKKDKY
SLAGGLLAAGAGGP--AGVGQRLESYAHMNGWANGAYAMMQEQLAYSQHPGAGAHNPQPM
HRYDMSALQYSPLSSSQSYMSASPSYALSYPQHQSALGSLVKSEPSVSPPVTSHSRGPC

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>sox2_Geotrypetes_seraphini

MYSMMETDLKPPAPQQASGGNANSAGGNPKNSPDRVKRPMNAFMVWSRGQRRKMAQENPK
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TLPGGLLAPGGNGMSAAGVNRMDSYAHMNGWTNGGYGMMQEQLGYPQHPGLNAAQMOPM
HRYDVSALQYNSMAGSQTYMNGSPTYSMS-YSQQGTSMGSVVKSESSSSPPVSSHAR-PC
QGDLRDMISMYLPGAIEVPEPAPPSRLHMTQHYQGATAINGTLPLSHM

>sox3_Geotrypetes_seraphini

MYSMLESCLKSPVAQPNSA-GSAAPGAKSGADQDRVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGADWKLLSDAEKRPFIDEAKRLRAVHMKEYPDYKYRPRRKTCTLLKKDKY
SLPGNLLAPGASPVASVGVGQRIDTYAHMNGWTNGAYSLMQDQLGYTQHPAMNSPQIQQM
HRYDMTGLQYSPMSSAQSYMNAASTYTMSPYGGQASMGSVVKSEPSSPPITSHSQRAC
LGDLRDMISMYLPGGDATDPASSSRLHVHQHYQSTTGTVNGTVPLTHI

>sox15_Geotrypetes_seraphini

MYAVMDQQLKLQMPQHS---SRPCESSPAVDPMKVKRPMNAFMVWSSQRRKMAQENPK
MHNSEISKRLGAEWKLLSEAEKRPFIDEAKRLRAMHMKDYPDYKYKPRRKTCTPTAKKEKY
PLVGAGAM---LSPGP-GGSPHMDSYS----WPPGGYAPIQSVLGYQ-----QPL
HRYDLSGLQYPPLTSPQSYMSASNSYSLSYPSQHSPTILPMVKQESGSLSPGVAHHRGGF
QGEFRDMMTMYGLGGDVAEPAGQRAYHPQPHYQN-LGLNGTAPLTHL

>Branchiostoma_floridae_soxB1

---MMETAVHQAQSPQPSAGAVSPGNKAANDSSRVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGAEWKLLTEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKY
SLPGGLIAANGAPVQR-TIATGMDQYAHMNGYSNNAYHMMHQQLAYP-HPGISPSNASLP
PRYDMSGQI-PPMATTNSYSSYTSSYTNPYTTTPQTPGFTTVKTEAGPAAPTDGRGRNPC
PGDLREMISMYLP-GDANDPNAQSRLHMQGHYQNSVGVNGTVPLSHM

>soxB1_Strongylocentrotus_purpuratus

MSVVMASIPGMATQASVMGGGNKNNSNPNNNPDRVKRPMNAFMVWSRGQRRKLSQENPK
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TLPGIINPQTGAPVQR-GVGDGMHGYQHNLGYMNG-YSMMQDQLSHLPSHSYGAANSGLH
HRYDMAQLGYPAMSTAASYLSPAAAYSAA-YSQAAMSGTSAKSEQASMPTEVSAGGRPM
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>sox1_Callorhinchus_milii

MYSMMESELHSPGPQSNTGPAGGGGGTNSKMNAERVKRPMNAFMVWSRGQRRKMAQENPK
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SLPGGLLAAGPGMGMMVGMGQRLDGYSHINGWANSAYVMMQEQLTYGQHPALAAHTPQQM
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PGDLREMISMYLPTAEGSDPS-QSRLHLPQHYQSATGVNGTIPLTHM

>C_milii_sox2

MYNMMETDLKPPASQQTSGG--NSANNANKNSPDRVKRPMNAFMVWSRGQRRKMAQENPK
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TLPGGLLAPGANPMGAAGVNRMDGYAHMNGWANGGYSMQEQLGYPQHPGLNAAQMQQM
HRYDVSALQYNSMTSGQPYMNGSPTYSMSPYTQQSTSMGSVVKSESSTSPVSTHSRPPC
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>C_milii_sox3

MYSMMETELKSPIPQSNAGSGGGGGGNNNNNNPDRVKRPMNAFMVWSRGQRRKMAQENPK
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SLPGGLLAPGSNPVNSVGVSQRMDSYPHVNGWANGAYPLMQEQLAYSQHPGMNSPQIQQM
HRYEMAGLQYSPMSTAQSYMNAASTYTMSPYGQQSTMASMKSEPTTPPPLTSHSRGAC
LGDLRDMISMYLPGGDGTDPTSASRLHVHQHYQTTTGVNGTVPLTHI

>C_punctatum_sox1

MYSMMEGELQSPGPVSA---PVPAGGTNGKVSGERVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGAEWKLMSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLLKKDKY
SLPAGLLSPGPALSSPGLNQRLDGYAHMNGWANGAYVMMQDPLAYSQHPALAAHHPQQL
HRYDMS-LQYSPI-GTQGYMSGSPSYPIPSYSHQGASLGSVMKSESPSPPVSSH SRPPC
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>C_punctatum_sox2

---METDLKPPAPQQTSGGNSNSAGNNAKNPDRVKRPMNAFMVWSRGQRRKMAQENPK
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TLPGGLLAPGANAMNAAGVNRMDGYAHMNGWANGGYSMQEQLGYSQHQGLNAAQMQQM
HRYDMSALQYNSMTSAQTYMNGSPTYSMSPYTQQGTSMGSVVKSESSTSPVTTHSRPPC
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>C_punctatum_sox3

MYSMMETDLKPAVSQSNTGA-----GANPDRVKRPMNAFMVWSRGQRRKMAQENPK
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SLPGGLLSPGAVPVNNVGASQRMESYSHMNGWANGTYPLMQDQLAYSQHPGINSPIQPM
HRYEMASLQYSPMSSAQNYMNAASTYSMSPYGQQNT-ISSMKTEPTTPPPLTSHSRGAC
LGDLRDMISMYLPGGDAGDPSASSRLHVHQHYQNSTGVSSTVPLTHI

>C_punctatum_sox15

-----NAFMVWSRGQRRKMAQDHPK
MHNSEISKRLGAEWKLLGDADKRPFIDEAKRLRAVHMKDYDPDYKYRPRRKSALPRKDRF
SLAAAAA-----PSGSP----YL----WAGGGYSLAQA--SCPQAAAASSPYPLQ
PRYELPYAAASP--PSQAYLTGSSSYSLAPHLHQPP--SAMSKPA-----AGAQAARGAL

PGELRDMLSLYIP-GDGSEALGHR SYHIPQHYQN-MPLNGTLP LTHI

>S_torazame_sox1

MYSMMESELQGGPGVGA---PLSSPGTNGKVS GERVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGA EWKLMSEGEKRPFIDEAKRLRALHMKEHPDYKYRPRRKT KTLLKKDKY
SLPASLLPPGVG PLGPAGLSQRLDGYAHMNGWANGAYVMVQD--HYSQLAGTASHHPQQL
HRYDMS-LQYSPLPGAQGYMGTSPTYSLTAYSHQAPT LGSMVKSEASASPPGSSHPRAPC
SGDLREMISMYLPAGECGDPG-QTRILLAQHYQTATAGSGTIPLTHM

>S_torazame_sox2

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HRYDMSALQYNSMTGAQTYMNGSPTYSMSPYTQQSTSMGSVVKSESSTSPVTT HSRPPC
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>S_torazame_sox3

MYSMMETELKSAMPQAN-----NNNPDRVKRPMNAFMVWSRGQRRKMAQENPK
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SLPGGLLSPGAVAVNSVGVSQRMDSYPHMNGWANGTYPLMQDQLAYSQHAGINSPQIQQM
HRYEMASLQYSPMSTAQTYMNAASTYSMSPYGQQNT--SSMVKTEPTTPPPLSSHPRGAC
LGDLRDMISMYLPGGDGSDPASGSRLHVHQHYQSTTAVSGTVPLTHI

>Xenopus_tropicalis

MH-----PQHSPPA-----PAPPNESPLVKRPMNAFMVWSSGERKRMSARHPK
MHNSEISRRLGEIWRGLGEDERRPFREEAKRLRAQH AIDYPGYKYAPRKKRKERGEPPKV
PLPC-----PGSSPPRDP-THYNGF---GY-----GY-----
-----LPYPP-----RPE-----PFL
P--VSDVSALYGFLYDYGEHRGAPQ---QVQYQT-LEVDGT-SFTDL

>Xenopus_laevis

M-----PTHD--P-----GNPPKESGLVKRPMNAFMVWSSGERKRMSALHPK
MHNSEISRRLGEIWRGLGEEDRRPFREEAKRLRAQH AIDFPGYKYAPRKKRKDKGGELAS
PTPPAAPR-----PALSPPTDP--QYSGY--LY-----GY-----
-----LPYPP-----RPE-----SFL
P--VSDVSALYGFLYDYGEHRGVQQ---QVQYQT-LEVEGT-SFTDL

>Mus_musculus

MALSLHPRAST--PQEQE--AGGSPGASGGLPLEKVKRPMNAFMVWSSVQRRQMAQQNPK
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SQEGGGLA-CGGSH-----W---GYTTTQGRGGYQ-----
-----PP-NYSTAYLPGS--YSSHCRPEAPL--CTFPQSD-----PRL

QGELRPSFSPYLSDDS--TP-----YNTS--AGAPMPVTHL

>Pelodiscus_sinensis

MAE-----GVGMAGAPVGEPLDKVKRPMNAFMVWSSGQRRRLAQEHPK

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PRYP---QY-P--ASQAYGNAAGGYSLSYYKQDPQ-----HPEGVL

PADFRDMMAAYGLACDMGESFP-----QPPYEAP---GLTPL---

>sox1_Amblyraja_radiata

MYSMMESELQSPGPISA---TVPAAGTNGKLSGERVKRPMNAFMVWSRGQRRKMAQENPK

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SLPTALLPQGHGAL---GLSQRLDVYGHMNGWANGSYVMMQEQLSYSQHPALAAHHPQQL

HRYDMP-LQYSPLTGTQSYMMSGSPSYTLSSYSHQPAQLASMVKLEPAPSPPVSSHRRPPC

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>sox2_Amblyraja_radiata

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HRYDMSALQYNSMTSAQTYMNGSPTYSMSPYTQST-----

-----NSWK-----

>sox3_Amblyraja_radiata

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SLPSGILSPGSVPINSVGVSQRIDSYPHMNGWANGTYPLMQDQLTYSQHGMSSPQLQQM

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>sox1a_Oryzias_latipes

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MHNSEISKRLGAEWKVMSEAEKRPFIDEAKRLRAMHMKEHPDYKYRPRRKTKTLLKKDKY

SLAGGLLSGPGSGA--SGVGQRLESYAHMNGWANGAY-----XQHPGSGSHNPQPM

HRYDMTALQYSPISNSQSYMNASPSYGITYTQHQGSTLGSLVKSEPSVSPVSSHRRGPC

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>sox1a_Maylandia_zebra

MYSMMETDLHSPGPQTNTTTGQTGPNSGSKANQERVKRPMNAFMVWSRGQRRKMAQENPK

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>sox1b_Oryzias_latipes

MYSMMETDLHSPVPQTNPSN---GGPGGKVPQERIKRPMNAFMVWSRGQRRKMAQENPK
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SLAGGLLGSSAG---MGGGQRLESYSHVNGWANGAYAMMQEQLAYTQHPGAGAHGAQPV
HRYDMSALPYSPISNSQSYMSASPPYGITGHQHQSSSTLGSLVKSEPSVSPPVSSRAMPPC
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>sox19_Lepisosteus_oculatus

MYSMMEHELKSSAPPPHQPGGAKAACPPGGDPMDKVKRPMNAFMVWSRGQRRKMAQENPK
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PLSAGNLLAAAAAQGP-GGSPRVDSY---GWPTGGYAGMQSALGYP-----QQL
HRYDLSALQYPPMATAQSYMNGAGSYPMSSPQQPSSVMSMVKPEPVSHSPTPSHHRGAL
QGDRLDMISMYIPSSDTPDPAARQGYTVQQHY-----LSGTVPLTHI

>sox3_Lepisosteus_oculatus

MYSMMETEIKTPLPPNSGSTNGGKNGGSTNDQDRVKRPMAFMVWSRGQRRKMAQENPK
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SLPGGLLAPGGNAVNNSAAQRMDSYAHMNGWSNTAYSLMQDQLGYPQHPSMNSPQIQQM
HRYEMAGLQYNPMSSAQTYMNAASTYSMSPTYTQQTSTMASVCKTEPSSPPITSHSQRAC
LGDRLDMISMYLPGGDGADHATSSRLHVHQHYQSATGVNGTLPLTHI

>sox2_Lepisosteus_oculatus

MYNMMETELKPPALQANAGGNSNSSGNSQKNSPDRVKRPMAFMVWSRGQRRKMAQENPK
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TLPSGLLAPGGNTMSSAAVNQRMDSYAHMNGWTNGGYGMMQEQLGYPQHPLNAAQMOPM
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>sox1_Lepisosteus_oculatus

MYSMMETDLHSPGPQTNANSGQTGPNSGNKSNQDRVKRPMAFMVWSRGQRRKMAQENPK
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HRYDMTALQYSPISNSQSYMSASPSYGISYTQHQNSTLGSLVKSEPSVSPPVTSHSRAPC
PGDLREMISMYLPTGEAGDPSVQNRLHLPQHYQSTTGTVNGTVPLTHI

>sox1_Maylandia_zebra

MYSMMETDLHSPVPQTNPSNNGGGGGGAGGKVPQERIKRPMNAFMVWSRGQRRKMAQENPK
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SLAGGLLGSSAAVG--MGGGQRLESYTHVNGWANGAYAMMQEQLAYTQHPGTGAHNPQPV
HRYDMSALSYPISNSQSYMSASPPYGITGHQHQSSSTLGSLVKSEPSVSPPVSTRAPPC

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>soxB1_Petromyzon_marinus

MYSMLEAELKPVGPQPKVSGGVLGAGGDGKVPDDRVRPMNAFMVWSRGQRRKMAQENPK
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SLQGGLLASGGPPGSAAGLGQRLDPYPQLNGWPNGSAGLQQEPLAYSQHAALSAAQLQGL
HRYDMSGQLQYLP--GGQGYLNGAAAYSVSYHSHQPQSLTSVGKSEAAPSPPVGGSGRAAC
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>sox2_Maylandia_zebra

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>sox2_Oryzias_latipes

MYNMMETELKPPAPQNTNTGGNTNTSGTNQKNSPERVKRPMNAFMVWSRGQRRKMAQENPK
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TLPGGLLAPGGNGMGTGGVNQRMDSYAHMNGWTNGGYGMMQDQLSY-QHAGLNASQMMPM
HRYDMSALQYNSMTSSQSYMNGSPTYSMS-YSQQTSMGSSVVKSESSSSPPVSSHAPGC
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>sox3_Maylandia_zebra

MYNMMETELKTPLPQNSNGS--PGAKNNSASDQERVKRPMNAFMVWSRGQRRKMAQENPK
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SLPGGLLAPGTNPVNNVSVGQRMDGYAHMNGWTNSAYSLMPDQLPYPQHSMNSPQIQQM
HRYEMAGLQY-PMSSAQTYMNAASTYSMSPTYTQQTSMASVCKTEPSSPPITSHSQRAC
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>sox3_Oryzias_latipes

MYNMMETEIKTPLPQNSNGS--AGAKNNSANDQERVKRPMNAFMVWSRGQRRKMAQENPK
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SLPGGLLAPGANAVNNVSVGQRMDGYAHMNGWTNSAYSLMQDQLAYPQHPSMNSPQIQQM
HRYEMAGLQY-PMSSAQTYMNAASTYSMSPTYTQQTGSMGSVCKTEPSSPPITSHSQRAC
LGDRLDMISMYLPGGDSAHSRSSRLHVHPHYQSATGVNGTLPLTHI

>soxB1_Saccoglossus_kowalevskii

M--MEQTDLKQVS---MMGTPTSSSANKMLGPDRVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGAEWKLLSEAEKRPFIDEAKRLRAVHMKEHPDYKYRPRRKTCTLMKKDKY
GLPGMISPGGGAPVQR-----AVDGY-PLNGYMNGGYPMMPQQLTYQPHSLASAANGGLH
PRYDMPSQIYTPMCTAGSYVNPPTSMTAYTTQHNAAVGISKSEPMVSAATVAANRRSC

PGDLREMISMYLP-GDANDPNARQHSNMVAHQEQYVG VNGVSHYDHE

>soxB1-2_Branchiostoma_floridae

MSTM MHQERKED-----EAAKKDHVKRPMNAFMVWSRIQRRKIAEDNPK
MHNSEISRRLGEMWKELSVEEKKPFVEESKRLRAEHMEKYPDYKYRPRRKLKTMMKNSSF
TMPGGMPPPASNCS--PALQMSMPEYGHMNGYMSGYHSMMRDPAPYS-HQVIPSTAGSMP
TRYDMAALTYSTP-PTTSYTTSS---ALQPYPVSSYDFCAPVKPE-----RTL
PASYYDDHIRPYYS-----EHC

>soxB1-3_Branchiostoma_floridae

M--MMH-----PEML---APGHEDAPLPKKADRVKRPMNAFMVWSRGQRRKIAEDNPK
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PLPGMPMQSPGGTTGMP---PPYPPHSYMNGYMNNGYYSMMDQFPYQRYPLIPPDHDGP
VDYSRAAYPYSPVTTSESPNSSPPSRTSSPYTAPTS---SYVASATAYAGPAIPHHRAPY
PGDLQEMIRMYLPAGSAS-----

>sox19_Oryzias_latipes

MYSLMEHEMKPAGHPQHAAHPKTACAPGNDPMDKVKRPMNAFMVWSRGQRRKMAQENPK
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PLSAGNLL-AAAAQGG-GASPRMESY---GWPAGGYSGMQGALGYS-----QPL
HRYELSALQYPPMTAAQTYMGGANSYPMTYSPQQPSPVMSMMKAEQVSHSPAPTHHRGAL
QGDLRDMISMYIPGGDASDAAAQRGYAVQQHY----LSGTVPLTHI

>sox19_Maylandia_zebra

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PLTAGNLL-VAAAQSQ-GGSPRMESY---GWPTGGYAGMQGALGYT-----QQL
HRYELSALQYPPMTAPQTYMNGANSYPMSYSPQQPSPVMSMKSEPVSHSPTPNHHRGAL
QGDLRDMISMYIPGGDASDPSTQRGYTVQQHY----LTGTVPLTHI

>H_affinis_sox1

MYSMMESELHSPGPQSNTGPA--SGGNNSKMNAERVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGAEWKLMSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTTLKKDKY
SLPGGLLA-GPGSMGMIGMGQRLDSYSHINGWANSAYVMMQEQLTYSQHPALAAHTPQQM
HRYDVS-LQYSPISSSQGYMTASPTYSSISSYSQQSSSLGSMVKSEPSASPPVGSHSRAPC
PGDLREMISMYLPAAEGSDPT-QSRLHLPQHYQSATGVNGTIPLTHM

>H_affinis_sox2

MYNMMETDLKPPASQQSSGG--NSANNANKNSPDRVKRPMNAFMVWSRGQRRKMAQENPK
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TLPGGLLAPGANPMGAAGVNQRMDGYAHMNGWANGGYSMPEQLGYPQHPGLNAAQMQQM
HRYDVSA LQYNSMSSGQPYMNGSPTYSMSPYTQQSTSMG SVKSESSTSPVSTHSRPPC

QGDLRDMISMYLPGAEPESNAQSRLHIPQHYQSATGINGTLPLTHM

>H_affinis_sox3

MYSMMETELKSPIQPNTGTNGG----NNNNNPDRVKRPMNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGADWKLLSDAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKY
SLPGGLLAPGSNPVNSVGVSQRMDSYPHVNGWANGAYPLMQEQLAYSQHPGMNAPQIQQM
HRYEMAGLQYSPMSTAQSYMNAASTYTMSPYGQQSTSMTSMVKSEPTTPPLTPHSRGAC
LGDLRDMISMYLPGGEGTDPATASRLHVHQHYQTTTGVTNGTVPLTHI

(b)

(C_plagiosum_sox1:0.0039457074,((((((((C_plagiosum_sox2:0.0000027048,C_punctatum_sox2:0.0000027048)99:0.0070059443,((P_pectinata_sox2:0.0000027433,sox2_Amblyraja_radiata:0.0140100399)100:0.0069744697,S_torazame_sox2:0.0034995153)69:0.0000021432)87:0.0105404529,(C_milii_sox2:0.0000027048,H_affinis_sox2:0.0146305574)100:0.0492356340)87:0.0153935909,(((sox2_Danio_rerio:0.0354276130,(sox2_Maylandia_zebra:0.0038672433,sox2_Oryzias_latipes:0.0178170211)100:0.0596105259)96:0.0171477080,sox2_Erpetoichthys_calabaricus:0.0076365087)96:0.0161898285,sox2_Lepisosteus_oculatus:0.0353160561)95:0.0140569349,((sox2_Homo_sapiens:0.0496278134,(sox2_Gallus_gallus:0.0109430319,sox2_Podarcis_muralis:0.0333047129)91:0.0074820818)81:0.0047769458,sox2_Geotrypetes_seraphini:0.0512343936)98:0.0178344610)94:0.0411828091)100:0.1522801780,((((((((C_plagiosum_sox3:0.0038532906,C_punctatum_sox3:0.0000027048)100:0.0843788113,S_torazame_sox3:0.0460392965)96:0.0133008897,(P_pectinata_sox3:0.0241313045,sox3_Amblyraja_radiata:0.0567348362)95:0.0206413143)100:0.0551503774,(C_milii_sox3:0.0057206263,H_affinis_sox3:0.0323320692)100:0.0226805315)99:0.0583877030,(((sox3_Danio_rerio:0.0222927515,(sox3_Maylandia_zebra:0.0396697313,sox3_Oryzias_latipes:0.0065303611)100:0.0195493982)99:0.0342591268,sox3_Lepisosteus_oculatus:0.0586915525)99:0.0255342431,sox3_Erpetoichthys_calabaricus:0.0302997561)100:0.0750649446,(((sox3_Homo_sapiens:0.1817697858,sox3_Podarcis_muralis:0.1079290613)96:0.0417115171,sox3_Gallus_gallus:0.0437865491)98:0.0396387762,sox3_Geotrypetes_seraphini:0.0719463592)100:0.0635920595)89:0.0366477436)93:0.0751011118,((((C_plagiosum_sox15:0.0402828512,C_punctatum_sox15:0.0420357311)100:0.4443350636,P_pectinata_sox15:0.03591405852)72:0.1542869769,(sox15_Homo_sapiens:0.1998391266,Mus_musculus:0.1874656077)100:0.15415665870)91:0.2661894700,((sox15_Podarcis_muralis:0.10705278487,((Xenopus_tropicalis:0.0000026821,Xenopus_laevis:0.4570611456)100:2.2785545980,Pelodiscus_sinensis:0.4146928058)98:0.2946441164)99:0.3037654177,sox15_Geotrypetes_seraphini:0.2371853592)90:0.2336390886)78:0.1126144449,(((sox19a_Danio_rerio:0.1579887204,(sox19b_Danio_rerio:0.1453160920,(sox19_Oryzias_latipes:0.1218567978,sox19_Maylandia_zebra:0.0422894899)97:0.0373842136)92:0.0450611220)88:0.0238568385,sox19_Lepisosteus_oculatus:0.0416679867)74:0.0266313199,sox19_Erpetoichthys_calabaricus:0.0567563294)97:0.1555325347)100:0.4315844740)40:0.0356024858,((Branchiostoma_floridae_soxB1:0.3203945609,(soxB1-2_Branchiostoma_floridae:0.9474563553,soxB1-

3_Branchiostoma_floridae:0.5737246993)100:0.8163875000)92:0.0829533053,(soxB1_Strongylocentrotus_purpuratus:0.3949326121,soxB1_Saccoglossus_kowalevskii:0.4520966856)85:0.1741947899)100:0.2388444545)42:0.0365455425)65:0.0957828168,soxB1_Petromyzon_marinus:0.4107375746)87:0.0717314191,(((sox1_Homo_sapiens:0.0556103054,(sox1_Podarcis_muralis:0.0368412651,sox1_Gallus_gallus:0.0514754119)89:0.0214587525)98:0.0250498282,sox1_Geotrypetes_seraphini:0.0601741542)98:0.0377771295,((sox1_Erpetoichthys_calabaricus:0.0263536141,(((Danio_rerio_sox1a:0.0310446697,(sox1a_Oryzias_latipes:0.0281749626,sox1a_Maylandia_zebra:0.0270286800)98:0.0374152987)57:0.0154884710,Danio_rerio_sox1b:0.0672128732)58:0.0103312411,sox1_Lepisosteus_oculatus:0.0189400613)90:0.0138929301)94:0.0273470508,(sox1b_Oryzias_latipes:0.0420335929,sox1_Maylandia_zebra:0.0202256060)100:0.1483667565)95:0.0149232002)100:0.1068971924)84:0.0590024317,(sox1_Callorhinchus_milii:0.0167673593,H_affinis_sox1:0.0222750545)99:0.0751445825)100:0.1565458230,((P_pectinata_sox1:0.0293115063,sox1_Amblyraja_radiata:0.0579648404)100:0.0719413354,S_torazame_sox1:0.2003033553)91:0.0278409867)100:0.0395146858,C_punctatum_sox1:0.0000027048);

(c)

#NEXUS

[TITLE]

BEGIN TAXA;

DIMENSIONS NTAX=73;

TAXLABELS

C_plagiosum_sox1
C_plagiosum_sox2
C_plagiosum_sox3
C_plagiosum_sox15
P_pectinata_sox1
P_pectinata_sox2
P_pectinata_sox3
P_pectinata_sox15
sox1_Homo_sapiens
sox1_Podarcis_muralis
sox1_Gallus_gallus
sox1_Erpetoichthys_calabaricus
Danio_rerio_sox1a
Danio_rerio_sox1b
sox2_Danio_rerio
sox3_Danio_rerio

sox19a_Danio_rerio
sox19b_Danio_rerio
sox2_Homo_sapiens
sox2_Gallus_gallus
sox2_Podarcis_muralis
sox2_Erpetoichthys_calabaricus
sox3_Homo_sapiens
sox3_Gallus_gallus
sox3_Podarcis_muralis
sox3_Erpetoichthys_calabaricus
sox19_Erpetoichthys_calabaricus
sox15_Homo_sapiens
sox15_Podarcis_muralis
sox1_Geotrypetes_seraphini
sox2_Geotrypetes_seraphini
sox3_Geotrypetes_seraphini
sox15_Geotrypetes_seraphini
Branchiostoma_floridae_soxB1
soxB1_Strongylocentrotus_purpuratus
sox1_Callorhinchus_milii
C_milii_sox2
C_milii_sox3
C_punctatum_sox1
C_punctatum_sox2
C_punctatum_sox3
C_punctatum_sox15
S_torazame_sox1
S_torazame_sox2
S_torazame_sox3
Xenopus_tropicalis_sox15
Xenopus_laevis_sox15
Mus_musculus_sox15
Pelodiscus_sinensis_sox15
sox1_Amblyraja_radiata
sox2_Amblyraja_radiata
sox3_Amblyraja_radiata

sox1a_Oryzias_latipes
sox1a_Maylandia_zebra
sox1b_Oryzias_latipes
sox19_Lepisosteus_oculatus
sox3_Lepisosteus_oculatus
sox2_Lepisosteus_oculatus
sox1_Lepisosteus_oculatus
sox1_Maylandia_zebra
soxB1_Petromyzon_marinus
sox2_Maylandia_zebra
sox2_Oryzias_latipes
sox3_Maylandia_zebra
sox3_Oryzias_latipes
soxB1_Saccoglossus_kowalevskii
soxB1-2_Branchiostoma_floridae
soxB1-3_Branchiostoma_floridae
sox19_Oryzias_latipes
sox19_Maylandia_zebra
H_affinis_sox1
H_affinis_sox2
H_affinis_sox3

;

END;

BEGIN CHARACTERS;

DIMENSIONS NCHAR=287;

FORMAT MISSING=? GAP=- MATCHCHAR=. datatype=protein;

MATRIX

C_plagiosum_sox1 MYSMMEGELQSPGPVSA---
PVPAGGTNGKVSGERVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLMSEAEKR
PFIDEAKRLRALHMKEHPDYKYRPRRKTKTLLKKDKYSLPAGLLSPGPGALSSPGLNQRLDGYAH
MNGWANGAYVMMQDPLAYSQHPALAAHHPQQLHRYDMS-LQYSPI-
STQGYMSGSPSYPIPSYSHQGASLGSVMKSESPSPPVSSHSRPPCSGDLREMISMYLPGGEAGDPS-
QNRLLLAQHYQSPTAVNGTIPLTHM
C_plagiosum_sox2
MYNMMETDLKPPAPQQTSGGNSNSAGNNAKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMH

NSEISKRLGAEWKLLSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGANAMNAAAGVNQRMDGYAHMNGWANGGYSMMEQLGYSQHQGLNAAQMQQMHRYDMS
ALQYNSMTSAQTYMNGSPTYSMSPYTQQTSMGSSVVKSESSTSPVTTTHSRPPCQGDRLDMISMY
LPGAEPPEPTAQSRLLHMPQHYQSATGINGTLPLTHM

C_plagiosum_sox3

MYSMMETDLKPAVSQSNTGA-----

GANPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLSDAEKRPFIDEAKRL
RALHMKEHPDYKYRPRRKTCTLIKKDKYSLPGGLLSPGAVPVNNVGASQRMESYSHMNGWANG
TYPLMQDQLAYSQHPGINSPIQPMHRYEMASLQYSPMSSAQNYMNAASTYSMSPYGQQT-
ISSMVKTEPTTPPLTPHSRGACLGDLRLDMISMYLPGGDAGDPSASSRLHVHQHYQNSTGVSSTVP
LTHI

C_plagiosum_sox15

MYSGLELEQEQL-----

ELELKAAGAKLEADKVKRPMNAFMVWSRGQRRKMAQDHPKMHNSEISKRLGAEWKLLSDADK
RPFIDEAKRLRAVHMKDYDPDYKYRPRRKSAPPENDKFSLVAAAAAGGGAALLAPSGSP----YP----
WAGGGYALAAQ--SCPQAAAAASPYPLQPRYELPYAAASP--PSQAYLNGSTSYSLAPHLHQPP--
SAMSKPA-----AGAQARGALPGELRDMLSLYIP-SDGSEALGHRSYHIPQHYQN-MPLNGTVPLTHI

P_pectinata_sox1

MYSMMESE---PGQISA---

TVPTPGTNGKLSGERVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLMSESEKR
PFIDEAKRLRALHMKEHPDYKYRPRRKTCTLLKKDKYSLPAALLPQGPALGPVGLNQRLDGYG
HMNGWANGSYVMMQEQLSYTQHPALAAHHSQQLHRYDMP-
IQYSPLPGTQGYMSGSPSYTLSSYSHQPPQLGSMVKSEAPSPPVSSHSRPPCSGDLREMISMYLPG
GEAGDPS-PNRLLLSQHYQSPTGVNGTIPLTHM

P_pectinata_sox2

MYNMMETDLKPPAPQQTSGGNSNTAGNNAKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGANAMNAAAVNQRMDGYAHMNGWTNGGYSMMEQLGYSQHQGLNAAQMQQMHRYDMS
ALQYNSMTSAQTYMNGSPTYSMSPYTQQTSMGSSVVKSESSTSPVTTTHSRPPCQGDRLDMISMY
LPGAEPPEPTAQSRLLHMPQHYQSATGINGTLPLTHM

P_pectinata_sox3

MYSMMETELKPAVPPSNTGT-----

GSNPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLSDSEKRPFIDEAKRLR
ALHMKEHPDYKYRPRRKTCTLMKKDKYSLPGILSPGSVPVNSVGVVSQRMESYPHMNGWANGTY
PLMQEQLAYSQHPGINSPIQQMHRYEMASLQYSPMSTAQSYMNAATTYSMSPYGQQTSMSSM
VKTEPTTPPLTSHSRGACLGDLRLDMISMYLPGGDG-DPSSNSRLHVHQHYQGTGTVSGTVPLTHI

P_pectinata_sox15

MFGVLDQQQQP-----

GQPSPGASPKVELDKVKRPMNAFMVWSRGQRRKMAQQHPKMHNSEISKRLGAEWKLLSDSEKR
PFIDEAKRLRAVHMKDYDPDYKYRPRRKSALAKKEKFPLAGGTTLAQGPCGSLPCGSQRLDSF----
GWSPGGFATLPPPLAYQ-----PPAALQPRYE---LQYPP--ASQYPAGSSPYSLPPYRPPA---

SLPKSEVS-----ATHAQGAPPGELRDTISLFLPGSDGQELFGHRSYHLPQHYQN-VPLNGTVPLTHI

sox1_Homo_sapiens

MYSMMETDLHSPGAQAPTNLGGGGGGGGAKANQDRVKRP MNAFMVWSRGQRRKMAQENPKM
HNSEISKRLGAEWKVMSEAEKRPFIDEAKRLRALHMK EHPDYKYRPRRKT KTLLKKDKYSLAGG
LLAAGAGGGGAAAVGQRLESYAHVNGWANGAYAMMQEQLAYGQH PGAGGHNPQPMHRYDMG
ALQYSPISNSQGYMSASPSYGLPYGAHQNSALGSLVKSEPSGSP PAPAHSRAPCPGDLREMISMYLP
AGEGGDPAAQSRLHLPQHYQGAAGVNGTVPLTHI

sox1_Podarcis_muralis

MYSMMETDMHSPGAQVTTNLGGGGGGGGPKANQDRVKRP MNAFMVWSRGQRRKMAQENPK
MHNSEISKRLGAEWKVMSEAEKRPFIDEAKRLRALHMK EHPDYKYRPRRKT KTLLKKDKYSLAG
GLLGAGGPGGGPGGVGQRLESYPHMNGWANGAYAMMQEQLAYSQHPGGGAHNPQPMHRYDM
GALQYSPISNSQGYMSASPSYGISYQSHQNSALGSLVKSEPSVSP PVTSHSRAPCPGDLREMISMYL
PGGEGGDPAAQSRLHLPQHYQSATGVNGTVPLTHI

sox1_Gallus_gallus

MYSMMETDLHSPGAPAPGGLGGGGGGGGGKAGQDRVKRP MNAFMVWSRGQRRKMAQENPKM
HNSEISKRLGAEWKVMSEAEKRPFIDEAKRLRALHMK EHPDYKYRPRRKT KTLLKKDKYSLAGG
LLGAGPAAGGPGGVGQRLESYAHMNGWANGAYAMMQEQLAYGQH PGGGGHNPQPMHRYDMG
ALQYSPISNSQGYVSASPSYALPYQPHQNSALGSLVKSEPSVSP PVTSHSRAPCPGDLREMISMYLP
GGEGGDPAAQSRLHLPQHYQSATGVNGTVPLTHI

sox1_Erpetoichthys_calabaricus

MYSMMETDLHSPGPQTNTNPGQTGPNSGSKANQDRVKRP MNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKVMSEAEKRPFIDEAKRLRAMHMK EHPDYKYRPRRKT KTLLKKDKYSLAGGL
LAAGAGGGSAGVGQRLESYAHMNGWANGAYAMMQEQLAYSQH PATGAHNPQPMHRYDMSAL
QYSPISNSQSYMSASPSYGLTYTQHQSSTLGLVKSEPSVSP PVSSHSRAPCPGDLREMISMYLPTGE
AGDPSVQNRLHLPQHYQSATGVNGTVPLTHI

Danio_rerio_sox1a

MYSMMETDLHSPGPQTNTNPGQTGPNSGSKANQDRVKRP MNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKVMSEAEKRPFIDEAKRLRAMHMK EHPDYKYRPRRKT KTLLKKDKYSLAGGL
LG-----

AGVGQRLESYAHMNGWANGTYAMMQEQLAYSQHPSGSHNPQPMHRYDM TALQYSPISNSQSY
MSASPSYGISYTQHQNSTLSSLVKSEPNISPPVTTHSRGPCPGDLREMISMYLPTGESGDPSVQSRLH
LPQHYQSTAGVNGTVPLTHI

Danio_rerio_sox1b

MYSMMETDLHSPGAQTNTNTGHTGPNSGSKVNQDRVKRP MNAFMVWSRGQRRKMAQENPKM
HNSEISKRLGAEWKLMSEAEKRPFIDEAKRLRAMHMK EHPDYKYRPRRKT KTLLKKDKYSLAGG
LLAGSGGGG--

AGVGQRLESYAHMNGWTNGAYAMMQEQLAYGQHPSGAHNPQPMHRYEMTALQYSPLSNSQS
YMSASPSYGISYTHQNSALGSLVKSEPSVSPPVNAHSRAPCSGDLREMISMYLPTAEAGDPSVQSR
LHVPQHYQSSTSVNGTVPLTHI

sox2_Danio_rerio

MYNMMETELKPPAPQPNTGGNTNSSGNNQKNSPDRIKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSESEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGGNGMGAAGVNQRMDSYAHMNGWTNGGYGMMQEQLGYPQHPSLNAAQMOPMHRYDMSA
LQYNSMTNSQTYMNGSPTYSMS-
YSQQSTSMGSVVKSESSSSPPVSSHSGQCQGDLRDMISMYLPGAQVQDQSAQSRLLHMSQHYQSA
TTINGTIPLSHM

sox3_Danio_rerio

MYNMMETEIKSPIQSNSTGS--

TGGKNNSANDQDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLTDAEKRP
FIDEAKRLRAMHMKEHPDYKYRPRRKTCTLLKKDKYSLPGGLLAPGANAVNNVSVGQRM-
YTHMNGWTNSAYSLMQDQLAYPQHPSMNSPQIQMHRYDMAGLQY-
PMSTAQTYMNAASTYSMSPYTQQTSSMASVCKTEPSSPPPITSHSQRACLGDLRDMISMYLPGGDS
ADHSSTSRLLHVHPHYQSATGVNGTLPLTHI

sox19a_Danio_rerio

MYSMLEHDMKSAPVPTHQSAAVNSQQQQSSDPMDKVKRPMNAFMVWSRGQRRKMAQENPKM
HNSEISKRLGAEWKLLTDAEKRPFIDEAKRLRALHMKEYPDYKYKPRRKTCPVLKKDKYPLSAGN
LLAAAAAQGS-GGSPRMDSY---GWHTGGYPMQTALGYS-----
QQLHRYDLSALQYPSMATAQTYMNGANSYPMSTPQQPSPVMSMVKPEQVSHSPTHSHQRGPLQ
GDLRDMISMYIPGGDTTDSGAQRGYSIQQHY----LTGTAPLTHI

sox19b_Danio_rerio

MYSMMEHELKTAGPHTLQHSVSKTACPPGVDPMKVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLTDEKRPFIDEAKRLRAVHMKEYPDYKYKPRRKTALMKKKDKYPLAAGN
LLASAVAQGGQ-GGSPRMDGY---GWHAGGYMGMQGALGYP-----QQLHRYDLSALQYP---
AAQPYMNSASSYQMSYSPQQPSPVMSMVKPEPLSHSPTPNHHRGAFQGDLRDMISMYIPGGDTSE
SSNQRAYPVQQHY----LGGTVPLTHI

sox2_Homo_sapiens

MYNMMETELKPPGPQQTSGGNSTAAAGNQKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSETEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGGNSMASAGVNQRMDSYAHMNGWSNGSYSMMQDQLGYPQHPLNAAQMOPMHRYDVSA
QYNSMTSSQTYMNGSPTYSMS-YSQQGTSMGSVVKSEASSPPVSSHSG-
PCQGDLRDMISMYLPGAQVPEPAAPSRLHMSQHYQSGTAINGTLPLSHM

sox2_Gallus_gallus

MMETELKPPAPQQTSGGNSNSAANNQKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEI

SKRLGAEWKLLSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLLAPG
TNTMTTAGVNRMDSYAHMNGWTNGGYGMMQEQLGYPQHPGLNAAQMOPMHRYDVSALQY
NSMTSSQTYMNGSPTYSMS-YSQQGTSMGSVVKTESSSSPPVSSHRS-
PCQGDRLDMISMYLPGAEPPEAAPSRLHMSQHYQSATAINGTLPLSHM

sox2_Podarcis_muralis

MYNMMETELKPPAPQQTAGGNSNSGANNQKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGSNSMGAAGVNQRMDSYAHMNGWTNGGYGMMQEQLGYPQHPGLNAAQMOPMHRYDVSA
LQYNSMAGSQTYMNGSPTYSMS-YSQQGTSMGSVVKTESSSSPPVSSHRS-
PCQGDRLDMISMYLPGPEVAEPAAPSRLHMSQHYQNATAINGTLPLSHM

sox2_Erpetoichthys_calabaricus

MYNMMETELKPPAPQPNSSGNSNSSTNNQKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSETEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGGNAMSTAGVNQRMDSYAHMNGWTNGGYGMMQDQLGYPQHPGLNAAQMOPMHRYDMSA
LQYNSMTNSQTYMNGSPTYSMS-
YSQQGTSMGSVVKSESSSSPPVSSHRSRQCQGDRLDMISMYLPGAEPPEAAPSRLHMSQHYQSAT
TINGTLPLSHM

sox3_Homo_sapiens

MYSLLETTELKNPVPTQAAGTSGGASGGGGGTQDQDRVKRPMNAFMVWSRGQRRKMALENPKMH
NSEISKRLGADWKLLTDAEKRPFIDEAKRLRAVHMKEYPDYKYRPRRKTCTLLKKDKYSLPSGLLP
PGAAAAAAGVGVGQRLDTYTHVNGWANGAYSLVQEQLGYAQPPSMSSPALPPMHRYDMAGLQYS
PMPPAQSYMNVAAASYGMAPYGQQPAPMGSVVKSEPSPPPIASHSQRACLGDLRDMISMYLPGGD
AADAASGGRLHVVHQHYQGATAVNGTVPLTHI

sox3_Gallus_gallus

MYSMLETEIKTPQPTPGSAGGGAGSGAGAGSDQDQDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGADWKLLSDAEKRPFIDEAKRLRAVHMKEYPDYKYRPRRKTCTLLKKDKYSLPGNLL
APGGNAVSSVGVGQRLDTYAHMNGWTNGAYSLMQDQLGYGQHPGMNSPQLQPMHRYDMPGLQ
YSPMSTAQTYMNAASTYSMSPTYGQQPSSMGSVVKSEPSPPPIITSHSQRACLGDLRDMISMYLPGGD
DATDPSAGSRLHVVHQHYQSATAVNGTVPLTHI

sox3_Podarcis_muralis

MYSILESELKAPQPNPGGGSGGGGGGTGATDQDQDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGADWKLLSDAEKRPFIDEAKRLRAVHMKEYPDYKYRPRRKTCTLLKKDKYSLPGNLL
APGSGGVSSVGVGQRLDSYAHMNGWPNGAYSLMPEQLGYSQHPAMSNAQLQPMHRYDVSGLQY
SPMSSAQPYMSAASYTMSPTYGQQPSTMGSVVKSEPSPPPIITSHSQRACLGDLRDMISMYLPGGD
AADPSTGTRLHVVHQHYPSATAVNGTVPLTHI

sox3_Erpetoichthys_calabaricus

MYSMMETEIKSPLPQSNTGSGTGGKNANGNNDQDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGADWKLLTDAEKRPFIDEAKRLRAMHMKHEPDYKYRPRRKTCTLLKKDKYSLPGGLL
APGANTVNPVSVGQRMDSYAHMNGWTNGAYSLMQDQLGYPQHPSMNSPQIQMHRYEMAGLQ
YNPMSTAQTYMNAASTYTMSPTYTQQTASMASVCKSEASSPPITSHSQRACLGDLRDMISMYLPG
GDGADHSSTSRLHVVHQHYQTATGVNATLPLTHI

sox19_Erpetoichthys_calabaricus

MYSMMEHEIKSTGPPPHQHGGTKGTCPGGDPMDKVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLTDAEKRPFIDEAKRLRALHMKHEPDYKYRPRRKNKPLLKKDKYPLSAGNL
LAAAAAQGP-GGSPRMDSY---GWPTGGYAGMQSALGYT-----
QQLHRYDLSALQYPPMAPSQTYMNGANSYSMSYSAQQASSVMSMVKPEPVSHSPTPSHHRGGLQ
GDLRDMISMYIPSNDTADPSGQRGYAVQQHY----LNGTVPLTHI

sox15_Homo_sapiens

MALSLEPPAATAAPQERE--

GAGSPAAPGTLPLEKVKRPMNAFMVWSSAQRRQMAQQNPKMHNSEISKRLGAQWKLLDEDEKR
PFVEEAKRLRARHLRDYPDYKYRPRRKAKSSGAGPRCGQGRGNLA-SGGPL-----W---
GYATTQPRGGYR-----PP-SYSTAYLPGS--YSSHCKLEAPS--CSLPQSD-----
PRLQGELLPTYTHYLPGPS--TP-----YNPP--AGAPMPLTHL

sox15_Podarcis_muralis

MFTVFPAE----

PLQQEPGRALPPPPAPEDPLEKVKRPMNAFMVWSSAQRRKMAQEHKPMHNSEISKRLGAAWKLL
PDAEKRPFVDEAKRLRALHMKDYDPDYKYRPRRKGGSGRARDK-GAPAAAASPGTFPCAP-----
AETRAW-----AYAASPGGT-DGRGACYPYELA---GPGGGGGGYGAGSPAYTLT-
YGAQPSVMTTMIKQEGGLQQF---HHS---GDFHDVMTAYSLACDAAEGAP--QYCSQHPY---
LGFSNTPPLTHL

sox1_Geotrypetes_seraphini

MYSMMETDLHSPGGQPPSNTAGAGGGGGTKSNQDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKVMSEAEKRPFIDEAKRLRALHMKHEPDYKYRPRRKTCTLLKKDKYSLAGGLL
AAGAGGP--
AGVGQRLESYAHMNGWANGAYAMMQEQLAYSQHPGAGAHNPQPMHRYDMSALQYSPLSSSQSY
MSASPSYALSYPQHQSALGSLVKSEPSVSPVTSHSRGPCLGDLREMISMYLPGGEGGDPAAASRL
HLPQHYQSATGVNGTVPLTHI

sox2_Geotrypetes_seraphini

MYSMMETDLKPPAPQQASGGNANSAGGNPKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSEAEKRPFIDEAKRLRALHMKHEPDYKYRPRRKTCTLMKKDKYTLPGLL
APGGNGMSAAGVNQRMDSYAHMNGWTNGGYGMMQEQLGYPQHPLNAAQMMPMHRYDVSA
LQYNSMAGSQTYMNGSPTYSMS-YSQQGTSMGSVVKSESSSSPPVSSHAR-
PCQGDRLDMISMYLPGAEPPEPAPPSRLHMTQHYQGATAINGTLPLSHM

sox3_Geotrypetes_seraphini

MYSMLESDLKSPVAQPNSA-

GSAAPGAKSGADQDRVKRPMAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLSDAEK
RPFIDEAKRLRAVHMKEYPDYKYRPRRKTCTLLKKDKYSLPGNLLAPGASPVASVGVGQRIDTYA
HMNGWTNGAYSLMQDQLGYTQHPAMNSPQIQQMHRYSMTGLQYSPMSSAQSYMNAASTYTMS
PYGQQGASMGSVVKSEPSPPPITSHSQRACLGDLRDMISMYLPGGDATDPASSRLHVHQHYQST
TGVNGTVPLTHI

sox15_Geotrypetes_seraphini

MYAVMDQQLKLQMPQHS---

SRPCESSPAVDPMDBKVRPMNAFMVWSSSQRRKMAQENPKMHNSEISKRLGAEWKLLSEAEKRP
FIDEAKRLRAMHMKDYPDYKYRPRRKTCTAKKEKYPLVGAGAM---LSPGP-GGSPHMDSYS----
WPPGGYAPIQSVLGYQ-----

QPLHRYDLSGLQYPPLTPSQSYMSASNSYSLSYPSQHSPTILPMVKQESGSLSPGVAHHRGGFQGEF
RDMMTMYGLGGDVAEPAGQRAYHPQPHYQN-LGLNGTAPLTHL

Branchiostoma_floridae_soxB1

MMETAVHPAQSPPSAGAVSPGNKAANDSSRVKRPMAFMVWSRGQRRKMAQENPKMHNSEIS
KRLGAEWKLLTEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYSLPGGLIAANG
APVQR-TIATGMDQYAHMNGYSNNAYHMMHQQLAYP-HPGISPSNASLPPRYDMSGQI-
PPMATTNSYSSYTSSYTNPYTTPQTTPGFTTVKTEAGPAAPTDGRGRNPCPGDLREMISMYLP-
GDANDPNAQSRLHMQGHYQNSVGVNGTVPLSHM

soxB1_Strongylocentrotus_purpuratus

MSVVMASIPGMATQASVMGGGNKNNSNPNNNPDRVKRPMAFMVWSRGQRRKLSQENPKMH
NSEISKRLGAEWKLLSEDEKRPFIDEAKRLRAVHMKEHPDYKYRPRRKTCTLLKKDKFTLPGIINP
QTGAPVQR-GVGDGMHGYQHNLNGYMNG-
YSMMQDQLSHLPSHSYGAANGLHHRYDMAQLGYPAMSTAASYLSPAAAYSAA-
YSQAAMSGTSAKSEQASMPTEVSAGGRPMPGDLRDMINMYLP-GDANDPNVQRQ-
HMQQAAAAAVGVNGTVPLTHM

sox1_Callorhinchus_milii

MYSMMESELHSPGPQSNTGPAGGGGGTNSKMNAERVKRPMAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLMSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLLKKDKYSLPGGLL
AAGPGGMGMVGMGQRLDGYSHINGWANSAYVMMQEQLTYGQHPALAAHTPQQMHRYSVS-
LQYSPISGSQGYMTASPTYSLSSYSQQSSSLGSMVKSEPSASPPVGSHSRAPCPGDLREMISMYLPT
AEGSDPS-QSRLHLPQHYQSATGVNGTIPLTHM

C_milii_sox2

MYNMMETDLKPPASQQTSGG--

NSANNANKNSPDRVKRPMAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLLSEAEKRPFI
DEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLLAPGANPMGAAGVNQRMDGYAH
MNGWANGGYSMMEQLGYPQHPGLNAAQMQQMHRYSVSALQYNSMTSGQPYMNGSPTYSMS
PYTQQSTSMGSVVKSESSTPPVSTHSRPPCQGDRLDMISMYLPGAEPPEPNAQSRLHIPQHYQSAT
GINGTLPLTHM

C_milii_sox3

MYSMMETELKSPIQSNAGSGGGGGGNNNNNNPDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGADWKLLSDAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTTLMKKDKYSLPGGLL
APGSNPVNSVGVSRMDSYPHVNGWANGAYPLMQEQLAYSQHHPGMNSPQIQQMHRYSMAAGLQY
SPMSTAQSYMNAASTYTMSPTYGQQSTMASMVKSEPTTPPPLTSHSRGACLGDLRDMISMYLPGG
DGTDPSTASRLHVHQHYQTTTGVNGTVPLTHI

C_punctatum_sox1

MYSMMEGELQSPGPVSA---

PVPAGGTNGKVSGERVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLMSEAEKR
PFIDEAKRLRALHMKEHPDYKYRPRRKTTLKKDKYSLPAGLLSPGPGALSSPGLNQRLDGYAH
MNGWANGAYVMMQDPLAYSQHPALAAHHPQQLHRYDMS-LQYSPI-
GTQGYMSGSPSYPIPSYSHQGASLGSMVKSEPPSPVSSHSPPCSGDLREMISMYLPGGEAGDPS-
QNRLLLAQHYQSPTAVNGTIPLTHM

C_punctatum_sox2

METDLKPPAPQQTSGGNSNSAGNNAKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEIS
KRLGAEWKLLSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTTLMKKDKYTLPGGLLAPGA
NAMNAAGVNQRMDGYAHMNGWANGGYSMMQEQLGYSQHQGLNAAQMQQMHRYDMSALQY
NSMTSAQTYMNGSPTYSMSPYTQQGTSMGSVVKSESSTSPVTTTHSRPPCQGDRLDMISMYLPGA
EVPEPTAQSR LHMPQHYQSATGINGTLPLTHM

C_punctatum_sox3

MYSMMETDLKPAVSQSNTGA-----

GANPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLSDAEKRPFIDEAKRL
RALHMKEHPDYKYRPRRKTTLIKKDKYSLPGGLLSPGAVPVNNVGASQRMESYSHMNGWANG
TYPLMQDQLAYSQHHPGINSPIQPMHRYEMASLQYSPMSSAQNYMNAASTYSMPYGGQNT-
ISSMVKTEPTTPPPLTSHSRGACLGDLRDMISMYLPGGDAGDPSASSRLHVHQHYQNSTGVSSTVP
LTHI

C_punctatum_sox15

NAFMVWSRGQRRKMAQDHPKMHNSEISKRLGAEWKLLGDADKRPFIDEAKRLRAVHMKDYPDY
KYRPRRKSKALPRKDRFSLAAAAA-----PSGSP----YL---WAGGGYSLAQA--
SCPQAAAASSPYPPPLQPRYELPYAAASP--PSQAYLTGSSSYSLAPHLHQPP--SAMSKPA-----
AGAQAARGALPGELRDMLSLYIP-GDGSEALGHRYSYHIPQHYQN-MPLNGTLPLTHI

S_torazame_sox1

MYSMMESELQGPVGA---

PLSSPGTNGKVSGERVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLMSEGEKR
PFIDEAKRLRALHMKEHPDYKYRPRRKTTLKKDKYSLPASLLPPGVGPLGPAGLSQRLDGYAH
MNGWANGAYVMVQD--HYSQLAGTASHHPQQLHRYDMS-
LQYSPLPGAQGYMGTSPTYSLTAYSHQAPTLGSMVKSEASASPPGSSHPRAPCSGDLREMISMYLP
AGECGDPG-QTRILLAQHYQTATAGSGTIPLTHM

S_torazame_sox2

MYNMMETDLKPPAPQQTSGGNSNSAGNNAKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSEAEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTTLMKKDKYTLPGGLL
APGANAMNAAGVNQRMGDGYAHMNGWTNGGYSMQEQLGYSQHQLNAAQMQQMHRYDMS
ALQYNSMTGAQTYMNGSPTYSMSPYTQQSTSMGSVVKSESSTSPVTTSHRPPCQGDLRDMISMY
LPGAIEVPEPTAQSRLLHMPQHYQSATGINGTLPLTHM

S_torazame_sox3

MYSMMETELKSAMPQAN-----

NNNPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLSDSEKRPFIDEAKRL
RALHMKEHPDYKYRPRRKTTLIKKDKYSLPGGLLSPGAVAVNSVGVSQRMDSYPHMNGWANGT
YPLMQDQLAYSQHAGINSPQIQQMHRYSMASLQYSPMSTAQTYMNAASTYSMSPYGQQNT--
SSMVKTEPTTPPPLSSHPRGACLDLRDMISMYLPGDGDSPASGSRLHVHQHYQSTTAVSGTVPL
THI

Xenopus_tropicalis

MH-----PQHSPPA-----

PAPPNESPLVKRPMNAFMVWSSGERKRMSARHPKMHNSEISRRLGEIWRGLGEDERRPFREEAKR
LRAQHAIIDYPGYKYAPRKKRKERGEPPKVPLPC-----PGSSPPRDP-THYNGF---GY-----GY----
-----LPYPP-----RPE-----PFLP--VSDVSALYGFLYDYGEHRGAPQ---
QVQYQT-LEVDGT-SFTDL

Xenopus_laevis_sox15

M-----PTHD--P-----

GNPPKESGLVKRPMNAFMVWSSGERKRMSALHPKMHNSEISRRLGEIWRGLGEEDRRPFREEAKR
LRAQHAIIDFPGYKYAPRKKRKDKGGELASPTPPAAPR-----PALSPPTDP--QYSGY--LY-----GY---
-----LPYPP-----RPE-----SFLP--VSDVSALYGFLYDYGEHRGVQQ--
-QVQYQT-LEVEGT-SFTDL

Mus_musculus_sox15

MALSLHPRAST--PQEQE--

AGGSPGASGGLPLEKVKRPMNAFMVWSSVQRRQMAQQNPKMHNSEISKRLGAQWKLLGDDEEKR
PFVEEAKRLRARHLRDYPDYKYRPRRKSNSSTGSPFSQEGGGLA-CGGSH-----W---
GYTTTQGRGGYQ-----PP-NYSTAYLPGS--YSSHCPEAPL--CTFPQSD-----
PRLQGELRPSFSPYLSDS--TP-----YNTS--AGAPMPVTHL

Pelodiscus_sinensis_sox15

MAE-----

GVGMAGAPVGEPLDKVKRPMNAFMVWSSGQRRRLAQEHPKMHNSEISKRLGAAWRRLGAEAKR
PFIEEAKRLRACHMKDYPDYKYRPRRKGRAPTKE---LPTGRPPP-----QLPA-P---W---GY---
SPLAYQ-----PPRYP---QY-P--ASQAYGNAAGGYSLSYYKQDPQ-----
HPEGVLPAFRDMMAAYGLACDMGESFP-----QPPYEAP---GLTPL---

sox1_Amblyraja_radiata

MYSMMESELQSPGPISA---

TVPAAGTNGKLSGERVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLMSEGEKR
PFIDEAKRLRALHMKEHPDYKYRPRRKTTLKKDKYSLPTALLPQGHGAL---
GLSQRLDVYGHMNGWANGSYVMMQEQLSYSQHPALAAHHPQQLHRYDMP-
LQYSPLTGTQSYMSPSYTLSSYSHQPAQLASMKLEPAPSPPVSSHSRPPCSGDLREMISMYLPG

GETGDPS-SSRLLLSQHYQSPSGVNGTIPLTHM

sox2_Amblyraja_radiata

MYNMMETDLKPPAPQQTSGGNSNTAGNNAKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSEAEKRPFIDEAKRLRALHMKHEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGANAMNAAAVNQRMDDGYAHMNGWTNGGYSMMQEQLGYSQHQLNAAQMQQMHRYDMS
ALQYNSMTSAQTYMNGSPTYSMSPYTQQST-----NSWK----

sox3_Amblyraja_radiata

MYGMMEAELKPVGPQSNAGT-----

NNNPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLSDSEKRPFIDEAKRL
RALHMKHEHPDYKYRPRRKTCTLMKKDKYSLPSGILSPGSVPINSVGVSQRIDSYPHMNGWANGTY
PLMQDQLTYSQHPGMSSPQLQQMHRYEMASLQYSPMSTAQSYMNAATTYSMSPTYGQQSTSMSSM
VKTEPTTPPPLTSHSRGACLGDLRDMISMYLPGGEG-DPSSNSRLHVHQHYQSATGVNGTVPLTHI

sox1a_Oryzias_latipes

MYSMMETDLHSPGHQTNTSTGQTGPNGGSKANQERVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKVMSEAEKRPFIDEAKRLRAMHMKHEHPDYKYRPRRKTCTLLKKDKYSLAGGL
LSGPGSGA--SGVGQRLESYAHMNGWANGAY-----

-?QHPGSGSHNPQPMHRYDMTALQYSPISNSQSYMNASPSYGITYTQHQGSTLGSVLKSEPSVSPPV
SSHSRGPCPGDLREMISMYLPTGEPGDPSMQSRLHLPQHYQSAAGVNGTVPLTHI

sox1a_Maylandia_zebra

MYSMMETDLHSPGPQTNTTTGQTGPNSGSKANQERVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLMSEAEKRPFIDEAKRLRAMHMKHEHPDYKYRPRRKTCTLLKKDKYSLAGGL
LSGPGSGG--

SGVGQRLESYAHMNGWANGAYAMMQEQLAYSQHPGSGAHNPQPMHRYDMTALQYSPISNSQSY
MNASPSYGITYTQHQSSTLGSVLKSEPSISPLLE-----

sox1b_Oryzias_latipes

MYSMMETDLHSPVPQTNPSN----

GGPGGKVPQERIKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKVMTEAEKRPFID
EAKRLRAMHMKHEHPDYKYRPRRKTCTLLKKDKYSLAGGLLGSSAG----

MGGGQRLESYSHVNGWANGAYAMMQEQLAYTQHHPGAGAHGAQPVHRYDMSALPYSPISNSQSY
MSASPPYGITGHQHQSSTLGSVLKSEPSVSPPVSSRAMPPCAGDLRDMISMYLPGGEAGD---
QSRHLPQHYQSGATVNGTVPLTHI

sox19_Lepisosteus_oculatus

MYSMMEHELKSSAPPPHQGGAKAACPPGGDPMDKVKRPMNAFMVWSRGQRRKMAQENPKM
HNSEISKRLGAEWKLLTDAEKRPFIDEAKRLRALHMKHEYPDYKYKPRRKTCPPLKKDKYPLSAGN
LLAAAAAQGP-GGSPRVDSY----GWPTGGYAGMQSALGYP-----

QQLHRYDLSALQYPPMATAQSYMNGAGSYPMSPYSPQPSVMSMVKPEPVSHSPTPSHHRGALQ
GDLRDMISMYIPSSDTTDPAAQRGYTVQQHY----LSGTVPLTHI

sox3_Lepisosteus_oculatus

MYSMMETEIKTPLPPNSGSTNGGKNGGSTNDQDRVKRPMAFMVWSRGQRRKMAQENPKMH
NSEISKRLGADWKLTTDAEKRPFIDEAKRLRAMHMKHEHPDYKYRPRRKTCTLLKKDKYSLPGGLL
APGGNAVN NVSAAQRMDSYAHMNGWSNTAYSLMQDQLGYPQHPSMNSPQIQQMHR YEMAGLQ
YNPMSSAQTYMNAASTYSMSPTYTQQTSTMASVCKTEPSSPPPITSHSQRACLGDLRDMISMYLPG
GDGADHATSSRLHVHQHYQSATGVNGTLPLTHI

sox2_Lepisosteus_oculatus

MYNMMETELKPPALQANAGGNSNSSGNSQKNSPDRVKRPMAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSENEKRPFIDEAKRLRALHMKHEHPDYKYRPRRKTCTLMKKDKYTLPSGLL
APGGNTMSSAAVNQRMDSYAHMNGWTNGGYGMMQEQLGYPQHPLNAAQM QPMHRYDMSAL
QYNSMTSSQTYMNGSPTYSMS-
YSQQSTSMGSVVKSESSSSPPVSSHPRPPCQGD L RDMISMYLPGA EVPEPTAQ SRLHMSQH YQSAT
AINGTLPLSHM

sox1_Lepisosteus_oculatus

MYSMMETDLHSPGPQTNANSGQTGPNSGNKSNQDRVKRPMAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKVMSEAEKRPFIDEAKRLRAMHMKHEHPDYKYRPRRKTCTLLKKDKYSLAGGL
LAAGAGSGG-
AGVGQRLESYAHMNGWANGAYAMMQEQLAYSQHPSGAHN PQPMHRYDM TALQYSPISNSQSY
MSASPSYGISYTQHQNSTLGSLVKSEPSVSPPVTSHSRAPCPGDLREMISMYLPTGEAGDPSVQNRL
HLPQHYQSTTG VNGTVPLTHI

sox1_Maylandia_zebra

MYSMMETDLHSPVPQTNPSNGGGGGGAGGKVPQERIKRPMAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKVMTEAEKRPFIDEAKRLRAMHMKHEHPDYKYRPRRKTCTLLKKDKYSLAGGL
LGSSAAVG--

MGGGQRLESYTHVNGWANGAYAMMQEQLAYTQHPSGTGAHN PQPVHRYDMSALS YSPISNSQSY
MSASPPYGITGHQHQSSTLGSLVKSEPSVSPPVSTRAPPPCPGDLRDMISMYLPTGEAGDSSVQSRL
HLPQHYQSSTPVNGTVPLTHI

soxB1_Petromyzon_marinus

MYSMLEAELKPVGPQPKVSGGVLGAGGDGKVPDDR KRPMAFMVWSRGQRRKMAQENPKM
HNSEISKRLGAEWKLLTEAEKRPFIDEAKRLRALHMKHEHPDYKYRPRRKTCTLLKKDKFSLQGGL
LASGGPPGSAAGLGQRLDPYPQLNGWPNGSAGLQQEPLAYSQHAALSAAQLQGLHRYDMSG LQY
LP--

GGQGYLNGAAAYS VSYHSHQPQSLTSVGKSEAAPSPPVGGSGRAACPGDLREMISMYLPGSSAGS
EVAQSRLHLSQHYQNA-GPNGTIPLTHI

sox2_Maylandia_zebra

MYNMMETELKPPAPQTNNTGGNTNTSGNNQKNSPERVKRPMAFMVWSRGQRRKMAQENPKMH

NSEISKRLGAEWKLLSESEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGGNGMGTGGVNQRMDSYAHMNGWTNNGGYGMMQDQLGY-
QHPGLNASQM QSMHRYDMSALQYNSMTSSQSYMNGSPTYSMS-
YSQQTTSMGSVVKSESSSSPPVSSHAPGCQGDRLDMISMYLPGAEVSEPTAQTRLHMSGHYQSAT
TINGTLPLTHM

sox2_ *Oryzias latipes*

MYNMMETELKPPAPQNTNTGGNTNTSGTNQKNSEKRVKRPMAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLSESEKRPFIDEAKRLRALHMKEHPDYKYRPRRKTCTLMKKDKYTLPGGLL
APGGNGMGTGGVNQRMDSYAHMNGWTNNGGYGMMQDQLSY-
QHAGLNASQM QPMHRYDMSALQYNSMTSSQSYMNGSPTYSMS-
YSQQTTSMGSVVKSESSSSPPVSSHAPGCQGDRLDMISMYLPGAEVSEPTAQTRLHMSGHYQST
TTINGTLPLTHM

sox3_ *Maylandia zebra*

MYNMMETELKTPLPQSNSGS--

PGAKNNSASDQERVKRPMAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLTDSEKRPFI
DEAKRLRAMHMKEHPDYKYRPRRKTCTLLKKDKYSLPGGLLAPGTNPVNNVSVGQRMDDGYAH
MNGWTNSAYS LMPDQLPYPQHHSMNSPQIQQM HRYEMAGLQY-
PMSSAQTYMNAASTYSMSPYTQQTSMASVCKTEPSSPPPITSHSQRACLGDRLDMISMYLPGGDS
AEHSSSSRLHVHPHYQTATGVNGTLPLTHI

sox3_ *Oryzias latipes*

MYNMMETEIKTPLPQSNSGS--

AGAKNNSANDQERVKRPMAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLTDAEKRPF
FIDEAKRLRAMHMKEHPDYKYRPRRKTCTLLKKDKYSLPGGLLAPGANAVNNVSVGQRMDDGYA
HMNGWTNSAYS LMQDQLAYPQHPSMNSPQIQQM HRYEMAGLQY-
PMSSAQTYMNAASTYSMSPYTQQTGSMGSVCKTEPSSPPPITSHSQRACLGDRLDMISMYLPGGDS
AEHSSSSRLHVHPHYQSATGVNGTLPLTHI

soxB1_ *Saccoglossus kowalevskii*

M--MEQTDLKQVS----

MMGTPTSSSANKMLGPDRVKRPMAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLLSEA
EKRPFIDEAKRLRAVHMKEHPDYKYRPRRKTCTLMKKDKYGLPGMISPGGGAPVQR-----AVDGY-
PLNGYMNGGYPMMQPQLTYQPHSLASAANGGLHPRYDMPSQIYTPMCTAGSYVNPPTS YTM TAY
TTQHNAAVGISKSEPMVSAATVAANRRSCPGDLREMISMYLP-
GDANDPNARQHNSNMVAHQEQYVGVNGVSHYDHE

soxB1-2_ *Branchiostoma floridae*

MSTMMHQERKED-----

EAAKKDHVKRPMAFMVWSRIQRRKIAEDNPKMHNSEISRRLGEMWKELSVEEKKPFVEESKRL
RAEHMEKYPDYKYRPRRKLKTMMKNSSFTMPGGMPPPASNCS--
PALQMSMPEYGHMNGYMSGYHSMMRDPAPYS-HQVIPSTAGSMPTRYDMAALTYSTP-
PTTSYTTSS---ALQPYPVSSYDFCAPVKPE-----RTLPA SYDDHIRPYYS-----
EHC

soxB1-3_Branchiostoma_floridae

M--MMH-----PEML---

APGHEDAPLPKKADRVKRPMNAFMVWSRGQRRKIAEDNPKMHNSEISRRLGEMWKELSVEEKKP
FVDESKRLRAKHMEEHPDYKYRPRRKMKNTMKGAKFPLPGMPMQSPGGTTGMP---
PPYPPHSYMNGYMGNGYYSMMDQFPYQRYPLIPPDHGDGPVDYSRAAYPYSPVTTSESPNSSPPSR
TSSPYTAPTS---SYVASATAYAGPAIPHHRAPYPGDLQEMIRMYLPAGSAS-----

sox19_Oryzias_latipes

MYSLMEHEMKPAGHPQHAAHPKTACAPGNDPMDKVKRPMNAFMVWSRGQRRKMAQENPKM
HNSEISKRLGAEWKLLSDAEKRPFIDEAKRLRAVHMKEYPDYKYKPRRKTKPLLKKDKYPLSAGN
LL-AAAAQGQ-GASPRMESY---GWAGGYSGMQGALGYS-----
QPLHRYELSALQYPPMTAAQTYMGGANSYPMTYSPQQPSPVMSMMKAEQVSHSPATHHRGALQ
GDLRDMISMYIPGGDASDAAAQRGYAVQQHY----LSGTVPLTHI

sox19_Maylandia_zebra

MYSMMEHELKPTGPPSHQTSSSKTACAPGADPMDKVKRPMNAFMVWSRGQRRKMAQENPKMH
NSEISKRLGAEWKLLNDAEKRPFIDEAKRLRAVHMKEYPDYKYKPRRKTKPLLKKDKYPLTAGNL
L-VAAAQSQ-GGSPRMESY---GWPTGGYAGMQGALGYT-----
QQLHRYELSALQYPPMTAPQTYMNGANSYPMSYSPQQPSPVMSMVKSEPVSHSPTPNHHRGALQ
GDLRDMISMYIPGGDASDPSTQRGYTVQQHY----LTGTVPLTHI

H_affinis_sox1

MYSMMESELHSPGPQSNTGPA--

SGGNNSKMNAERVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLMSEAEKRPF
DEAKRLRALHMKEHPDYKYRPRRKTKTLLKKDKYSLPGGLLA-
GPGSMGMIGMGQRLDSYSHINGWANSAYVMMQEQLTYSQHPALAAHTPQQMHRYDVS-
LQYSPISSSQGYMTASPTYSSYSQSSSLGSMVKSEPSASPPVGSHSRAPCPGDLREMISMYLPAA
EGSDPT-QSRLHLPQHYQSATGVNGTIPLTHM

H_affinis_sox2

MYNMMETDLKPPASQSSGG--

NSANNANKNSPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGAEWKLLSEAEKRPF
DEAKRLRALHMKEHPDYKYRPRRKTKTLMKKDKYTLPGGLLAPGANPMGAAGVNQRMDGYAH
MNGWANGGYSMMPQLGYPQHPGLNAAQMQQMhRYDVSALQYNSMSSGQPYMNGSPTYSMSP
YTQQSTSMGSVVKSESSTPPVSTHSRPPCQGDLRDMISMYLPGAEPESNAQSRLHIPQHYQSATG
INGTLPLTHM

H_affinis_sox3

MYSMMETELKSPIQPNTGTNGG----

NNNNNPDRVKRPMNAFMVWSRGQRRKMAQENPKMHNSEISKRLGADWKLLSDAEKRPFIDEAK
RLRALHMKEHPDYKYRPRRKTKTLMKKDKYSLPGGLLAPGSNPVNSVGVSQRMDSPHYVNGWA
NGAYPLMQEQLAYSQHPGMNAPQIQQMhRYEMAGLQYSPMSTAQSYMNAASTYTMSPYGQQST
SMTSMVKSEPTTPPLTPHSRGACLGDLRDMISMYLPGGEGTDPATASRLHVHQHYQTTTGVNGT
VPLTHI

;

END;

```
BEGIN mrbayes;
charset pos = 1-287;
partition region = 1:pos;
set partition=region;
prset ratepr=variable aamodelpr=mixed;
lset nucmodel=protein rates=Invgamma;
unlink shape=(all) pinvar=(all) statefreq=(all) revmat=(all);
log start filename=log;
mcmc ngen = 300000 printfreq = 1000 samplefreq = 100 nchains = 4;
END;
```

(d)

#NEXUS

[ID: 2070249257]

```
begin taxa;
    dimensions ntax=73;
    taxlabels
        C_plagiosum_sox1
        C_plagiosum_sox2
        C_plagiosum_sox3
        C_plagiosum_sox15
        P_pectinata_sox1
        P_pectinata_sox2
        P_pectinata_sox3
        P_pectinata_sox15
        sox1_Homo_sapiens
        sox1_Podarcis_muralis
        sox1_Gallus_gallus
        sox1_Erpetoichthys_calabaricus
        Danio_rerio_sox1a
        Danio_rerio_sox1b
        sox2_Danio_rerio
        sox3_Danio_rerio
```

sox19a_Danio_rerio
sox19b_Danio_rerio
sox2_Homo_sapiens
sox2_Gallus_gallus
sox2_Podarcis_muralis
sox2_Erpetoichthys_calabaricus
sox3_Homo_sapiens
sox3_Gallus_gallus
sox3_Podarcis_muralis
sox3_Erpetoichthys_calabaricus
sox19_Erpetoichthys_calabaricus
sox15_Homo_sapiens
sox15_Podarcis_muralis
sox1_Geotrypetes_seraphini
sox2_Geotrypetes_seraphini
sox3_Geotrypetes_seraphini
sox15_Geotrypetes_seraphini
Branchiostoma_floridae_soxB1
soxB1_Strongylocentrotus_purpuratus
sox1_Callorhinchus_milii
C_milii_sox2
C_milii_sox3
C_punctatum_sox1
C_punctatum_sox2
C_punctatum_sox3
C_punctatum_sox15
S_torazame_sox1
S_torazame_sox2
S_torazame_sox3
Xenopus_tropicalis_sox15
Xenopus_laevis_sox15
Mus_musculussox15
Pelodiscus_sinensis_sox15
sox1_Amblyraja_radiata
sox2_Amblyraja_radiata
sox3_Amblyraja_radiata

```

sox1a_Oryzias_latipes
sox1a_Maylandia_zebra
sox1b_Oryzias_latipes
sox19_Lepisosteus_oculatus
sox3_Lepisosteus_oculatus
sox2_Lepisosteus_oculatus
sox1_Lepisosteus_oculatus
sox1_Maylandia_zebra
soxB1_Petromyzon_marinus
sox2_Maylandia_zebra
sox2_Oryzias_latipes
sox3_Maylandia_zebra
sox3_Oryzias_latipes
soxB1_Saccoglossus_kowalevskii
soxB1-2_Branchiostoma_floridae
soxB1-3_Branchiostoma_floridae
sox19_Oryzias_latipes
sox19_Maylandia_zebra
H_affinis_sox1
H_affinis_sox2
H_affinis_sox3
;

```

end;

begin trees;

translate

```

1      C_plagiosum_sox1,
2      C_plagiosum_sox2,
3      C_plagiosum_sox3,
4      C_plagiosum_sox15,
5      P_pectinata_sox1,
6      P_pectinata_sox2,
7      P_pectinata_sox3,
8      P_pectinata_sox15,
9      sox1_Homo_sapiens,
10     sox1_Podarcis_muralis,
11     sox1_Gallus_gallus,

```

12 sox1_Erpetoichthys_calabarius,
13 Danio_rerio_sox1a,
14 Danio_rerio_sox1b,
15 sox2_Danio_rerio,
16 sox3_Danio_rerio,
17 sox19a_Danio_rerio,
18 sox19b_Danio_rerio,
19 sox2_Homo_sapiens,
20 sox2_Gallus_gallus,
21 sox2_Podarcis_muralis,
22 sox2_Erpetoichthys_calabarius,
23 sox3_Homo_sapiens,
24 sox3_Gallus_gallus,
25 sox3_Podarcis_muralis,
26 sox3_Erpetoichthys_calabarius,
27 sox19_Erpetoichthys_calabarius,
28 sox15_Homo_sapiens,
29 sox15_Podarcis_muralis,
30 sox1_Geotrypetes_seraphini,
31 sox2_Geotrypetes_seraphini,
32 sox3_Geotrypetes_seraphini,
33 sox15_Geotrypetes_seraphini,
34 Branchiostoma_floridae_soxB1,
35 soxB1_Strongylocentrotus_purpuratus,
36 sox1_Callorhinchus_milii,
37 C_milii_sox2,
38 C_milii_sox3,
39 C_punctatum_sox1,
40 C_punctatum_sox2,
41 C_punctatum_sox3,
42 C_punctatum_sox15,
43 S_torazame_sox1,
44 S_torazame_sox2,
45 S_torazame_sox3,
46 Xenopus_tropicalis_sox15,
47 Xenopus_laevis_sox15,

48 Mus_musculus_sox15,
 49 Pelodiscus_sinensis_sox15,
 50 sox1_Amblyraja_radiata,
 51 sox2_Amblyraja_radiata,
 52 sox3_Amblyraja_radiata,
 53 sox1a_Oryzias_latipes,
 54 sox1a_Maylandia_zebra,
 55 sox1b_Oryzias_latipes,
 56 sox19_Lepisosteus_oculatus,
 57 sox3_Lepisosteus_oculatus,
 58 sox2_Lepisosteus_oculatus,
 59 sox1_Lepisosteus_oculatus,
 60 sox1_Maylandia_zebra,
 61 soxB1_Petromyzon_marinus,
 62 sox2_Maylandia_zebra,
 63 sox2_Oryzias_latipes,
 64 sox3_Maylandia_zebra,
 65 sox3_Oryzias_latipes,
 66 soxB1_Saccoglossus_kowalevskii,
 67 soxB1-2_Branchiostoma_floridae,
 68 soxB1-3_Branchiostoma_floridae,
 69 sox19_Oryzias_latipes,
 70 sox19_Maylandia_zebra,
 71 H_affinis_sox1,
 72 H_affinis_sox2,
 73 H_affinis_sox3

;

tree con_50_majrule = [U]
 (1[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:8.154690e-03[&length_mean=1.05728838e-02,length_median=8.15469000e-03,length_95%HPD={7.71009500e-05,2.67051200e-02}],39[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:4.081761e-03[&length_mean=6.23879950e-03,length_median=4.08176100e-03,length_95%HPD={2.01773400e-06,2.02939700e-02}],(((((((2[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:3.363098e-03[&length_mean=4.83141848e-

03,length_median=3.36309800e-03,length_95%HPD={1.21891200e-06,1.48331000e-02}],40[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:3.568835e-03[&length_mean=4.89663085e-03,length_median=3.56883500e-03,length_95%HPD={2.66233300e-05,1.44850100e-02}][&prob=9.81341626e-01,prob_stddev=1.94760642e-02,prob_range={9.67569969e-01,9.95113283e-01},prob(percent)="98",prob+-sd="98+-2"]:1.001971e-02[&length_mean=1.25591002e-02,length_median=1.00197100e-02,length_95%HPD={1.20544700e-05,3.05475600e-02}],((6[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:3.248826e-03[&length_mean=4.87406906e-03,length_median=3.24882600e-03,length_95%HPD={1.09634800e-05,1.54819300e-02}],51[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:2.755179e-02[&length_mean=3.25420934e-02,length_median=2.75517900e-02,length_95%HPD={5.71500700e-03,7.47625100e-02}][&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:1.205190e-02[&length_mean=1.43420482e-02,length_median=1.20519000e-02,length_95%HPD={5.79919700e-04,3.41001000e-02}],44[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:7.551353e-03[&length_mean=9.41424853e-03,length_median=7.55135300e-03,length_95%HPD={9.31475500e-04,2.39824900e-02}][&prob=5.99511328e-01,prob_stddev=2.23032348e-02,prob_range={5.83740560e-01,6.15282097e-01},prob(percent)="60",prob+-sd="60+-2"]:6.286222e-03[&length_mean=8.14871207e-03,length_median=6.28622200e-03,length_95%HPD={1.20903500e-05,2.19417800e-02}][&prob=9.73345180e-01,prob_stddev=1.88478040e-03,prob_range={9.72012439e-01,9.74677921e-01},prob(percent)="97",prob+-sd="97+-0"]:2.029942e-02[&length_mean=2.42419644e-02,length_median=2.02994200e-02,length_95%HPD={6.94921500e-04,5.51877100e-02}],(37[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:3.565674e-03[&length_mean=5.01837984e-03,length_median=3.56567400e-03,length_95%HPD={1.50590700e-05,1.47838700e-02}],72[&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:2.155736e-02[&length_mean=2.45968365e-02,length_median=2.15573600e-02,length_95%HPD={5.92393400e-03,5.29812500e-02}][&prob=1.00000000e+00,prob_stddev=0.00000000e+00,prob_range={1.00000000e+00,1.00000000e+00},prob(percent)="100",prob+-sd="100+-0"]:5.704966e-02[&length_mean=6.68136218e-02,length_median=5.70496600e-02,length_95%HPD={1.72301400e-02,1.48202300e-01}][&prob=9.24922257e-01,prob_stddev=1.38217230e-02,prob_range={9.15148823e-01,9.34695691e-01},prob(percent)="92",prob+-sd="92+-1"]:2.712378e-02[&length_mean=3.23552109e-

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(e)

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>sox15_C_plagiosum
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>sox15_P_pectinata

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>sox15_C_punctatum

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>sox15_Homo_sapiens

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>sox15_Mus_musculus

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>sox15_Canis_lupus_familiaris

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>sox15_Bos_taurus

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>sox15_Dasyus_novemcinctus

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>sox15_Loxodonta_africana

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>sox15_Phascolarctos_cinereus

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>sox15_Vombatus_ursinus

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>sox15_Podarcis_muralis

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>sox15_Lacerta_agilis

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>sox15_Pantherophis_guttatus

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>sox15_Zootoca_vivipara

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>sox15_Chrysemys_picta_bellii

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>sox15_Gopherus_evgoodei

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>sox15_Pelodiscus_sinensis

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>sox15_Xenopus_tropicalis

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>sox15_Xenopus_laevis

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>sox15_Rana_catesbeiana

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(g)

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(h)

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(i)

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>Terrapene_carolina_triongis

gtgaagcggcccatgaatgccttcattggtgtgtccagcgggcagcgcggcgctggcg
caggagcaccccaagatgcacaactcggagatctccaagcgctggggcgccctggcgc
cgctgccccgaggccgagaaacgccccttcgtggaggaagccaagcggtccgggcccgg
cacatgcgggactatcctgactacaagtaccgaccccgcgcaag

>Pelodiscus_sinensis

gtgaagcggcccatgaatgccttcattggtgtgtccagcgggcagcgcggcgctggca
caggagcaccccaagatgcacaactccgagatctccaagcgctggggcgccctggcgc
cggctgggcgaggctgagaaacgccccttcattcaggaggccaagcgtctccgggcctgc
catatgaaggactatcctgactacaagtaccgccccggcgcaag

>Podocnemis_expansa

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GTGAAACGGCCCATGAATGCTTTTCATGGTGTGGTCACGGGGCCAGCGGCGCCGCCTGGCT
CAAGAGGAGCCCAAGCTGCACAACTCAGAGATCTCCAAGCGCCTGGGGGCTGCCTGGCGC
CTGCTGGGTGAAGCTGAGAAACGGCCCTTCGTGGAGGAGGCCAAACGCCTGCGGGCCCGG
CATGTCCGTGACTACCCCAACTACAAGTACCGGCCCCGGCGCAAG
>Actinemys_marmorata
GTGAAGCGGCCCATGAATGCCTTCATGGTGTGGTCCAGCGGGCAGCGCCGGCGCCTGGCG
CAGGAGCACCCCAAGATGCACAACTCGGAGATCTCCAAGCGCCTGGGGGCGCCTGGCGC
CGCCTGCCCCGAGGCCGAGAAACGCCCTTCGTGGAGGAAGCCAAGCGGCTCCGGGGCCCGG
CACATGCGGGACTATCCTGACTACAAGTACCGACCCCGGCGCAAG

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(j)

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((((Carettochelys_insculpta,Pelodiscus_sinensis),(((Platysternon_megacephalum,(((Malaclemys_terrapi_n_
terrapi_n,Trachemys_scripta_elegans),Chrysemys_picta_bellii),(Terrapene_carolina_triunguis,Actinemys_ma
rмората))),((Cuora_mccordi,(Gopherus_evgoodei,Gopherus_agassizii))),Dermochelys_coriacea)),((Emydur
a_subglobosa,Mesoclemmys_tuberculata),(Pelusios_castaneus,Podocnemis_expansa))),((((Pantherophis_g
uttatus,Pantherophis_obsoletus),Ptyas_mucosa),(Thermophis_baileyi,Thamnophis_sirtalis)),(Vipera_berus_
berus,(Protobothrops_mucrosquamatus,(Crotalus_horridus,Crotalus_pyrrhus))),((Salvator_merianae,(Podar
cis_muralis,(Zootoca_vivipara,(Lacerta_agilis,(Lacerta_bilineata,Lacerta_viridis))))));

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Figure S9. Raw data used for phylogenetic tree inference and analyses of codeml and RELAX.

(a) An aa alignment of *soxB1/G* ohnologs used for maximum likelihood tree inference in Fig. 3 as fasta format. (b) A raw data of the maximum likelihood tree in Fig. 3 as newick format. (c) An aa alignment of *soxB1/G* ohnologs used for bayesian tree inference in Fig. 3 as nexus format. (d) A raw data of bayesian tree in Fig. 3 as nexus format. (e) A nucleotide alignment of *soxB1/G* ohnologs used for maximum likelihood tree inference and analyses of codeml and RELAX in Table 1 and Fig. 4 as fasta format. (f) A raw data of maximum likelihood tree in Fig. 4 as newick format. This tree was used for analyses of codeml and RELAX in Table 1 and Fig. 4. (g) A nucleotide alignment of mammalian *sox15* used for analyses of codeml and RELAX in Table 2 and Fig. 5 as fasta format. (h) A species tree of 16 mammals used for analyses of codeml and RELAX in Table 2 and Fig. 5 as newick format. (i) A nucleotide alignment of reptilian *sox15* used for analyses of codeml and RELAX in Table 2 and Fig. 5 as fasta format. (j) A species tree of 31 reptiles used for analyses of codeml and RELAX in Table 2 and Fig. 5 as newick format.