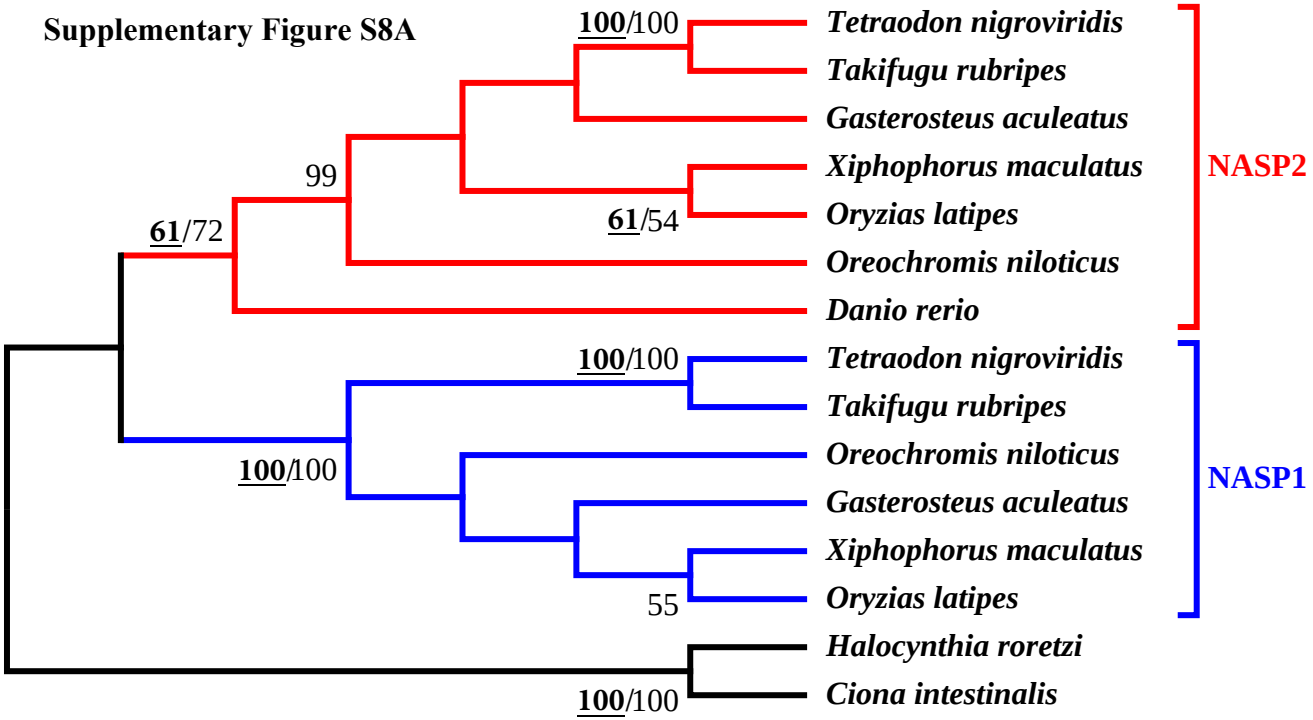
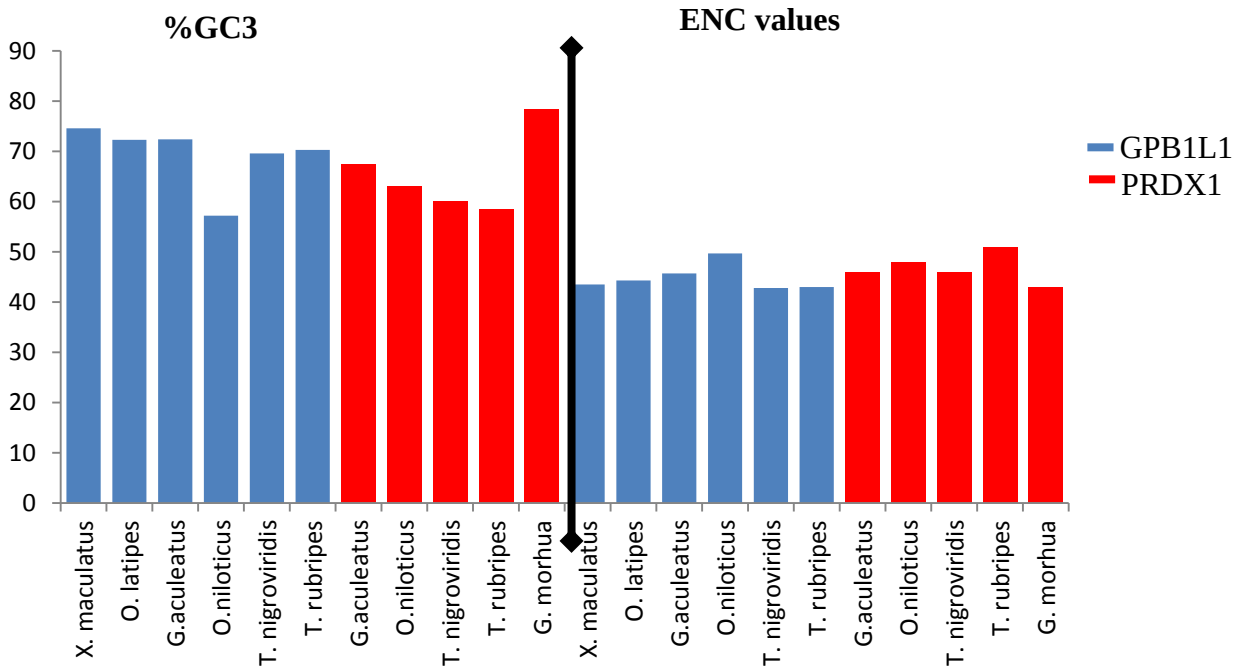
Figure S8A: Phylogenetic relationship among different fish specific NASP paralogs. Tree topology corresponds to the ML method under the JTT+G model as predicted by MEGA. Branch lengths do not reflect genetic distance. Alternatively, the same topology was also recovered by the neighbour joining method using p-distances. Confidence values for ML and NJ trees are based on 1000 bootstrap replicates and are indicated (≥ 50%) in light-face and boldface (underlined), respectively. The tree is rooted with *Halocynthia roretzi* and *Ciona intestinalis.* **Figure S8, B-C:** %GC3 content and ENC values are shown in chart diagrams for the fish-specific NASP1 and NASP2 neighbouring genes, respectively. Black line separates GC3 and ENC whereas blue and red colors represent different neighbouring genes as indicated in the chart legends. **Figure S8, D-G:** Predicted fish specific NASP1/2 TPRs 1-4 sequence alignments are shown in figures B to E, respectively. Reconstructed ancestral sequence using the ML method is shown in black background whereas different amino acid substitutions in each TPR motif for two paralogous proteins are shown in blue. **Figure S8, H-K:** Predicted NASP1/2 TPRs 1-4 sequence alignments are shown in figures H to K, respectively, for various lineages.

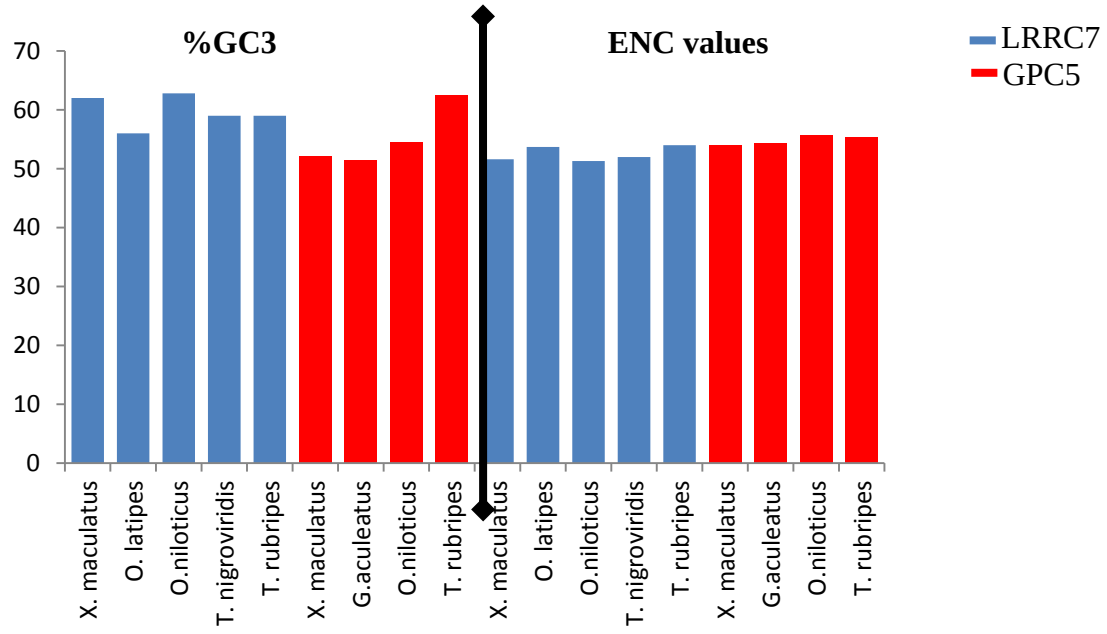
Supplementary Figure S8A



B


%GC3
ENC values
90
80
70
60
50
40
30
20
10
0
X. maculatus
O. latipes
G.aculeatus
O.niloticus
T. nigroviridis
T. rubripes
G.aculeatus
O.niloticus
T. nigroviridis
T. rubripes
G. morhua
X. maculatus
O. latipes
G.aculeatus
O.niloticus
T. nigroviridis
T. rubripes
G.aculeatus
O.niloticus
T. nigroviridis
T. rubripes
G. morhua
GPB1L1
PRDX1

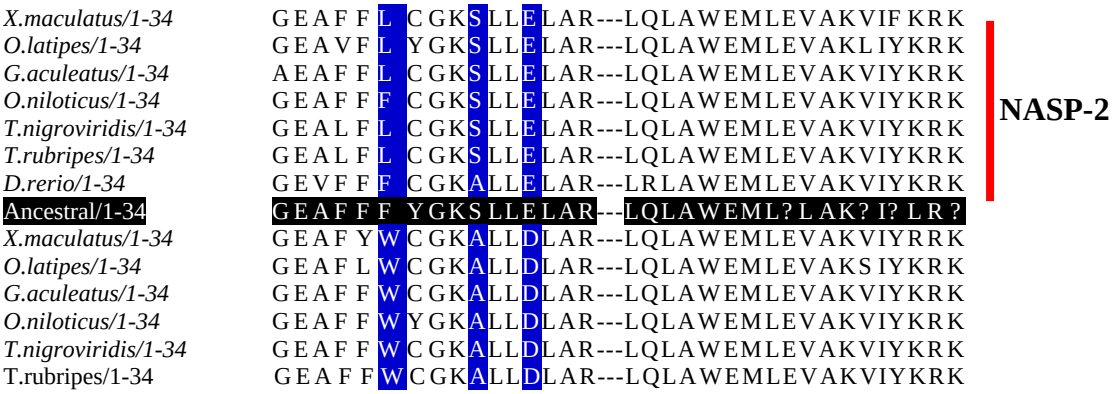
C


%GC3
ENC values
70
60
50
40
30
20
10
0
X. maculatus
O. latipes
O.niloticus
T. nigroviridis
T. rubripes
X. maculatus
G.aculeatus
O.niloticus
T. rubripes
X. maculatus
O. latipes
O.niloticus
T. nigroviridis
T. rubripes
X. maculatus
G.aculeatus
O.niloticus
T. rubripes
LRRC7
GPC5

D


X.maculatus/1-34 AKKLI GTGKRHLVMGDVVSAVNVFQEACSMLAAK
O.latipes/1-34 AKKLI GTGKRHLVMGDVVSAVNVFQDACSI LASK
G.aculeatus/1-34 ANKLI GTGNRHLVMGDVVSAVRVFQDACSMLAAR
O.niloticus/1-34 AKKLI GTGKRHLVMGDVVSAVSVFQEACGMLAEK
T.nigroviridis/1-34 AKKLVGAGNKYLVL GDVVSAVGVFQDACSMLAAK
T.rubripes/1-34 AKKLVGAGNKYLVL GDVVSAVAVFQDACSMLAAK
D.rerio/1-34 AKKLI GTGSRHLVMGDVVSAVSVFQEACAMLAEK
Ancestral/1-34 AKKL? G? GKKHLVMGDV? SAVNAFQEACS? LAEK
X.maculatus/1-34 ANKLVGTGKKFLVT GKVVEAVSALQEACGMLAKK
O.latipes/1-34 ANKLI GAGKKFLVMGKAVEAVSALQEACGMLAKQ
G.aculeatus/1-34 ANKLI GSGKKHLVMGKVVEAVSALQEACGMLAQK
O.niloticus/1-34 ANKLI GTGKKHLVMGKVVEAVSTLQEACGMLAKK
T.nigroviridis/1-34 ANKLVGAGKKHLVMGKVVEAVNSLQEACGI LAKT
T.rubripes/1-34 ANKLI GAGKKHLVMGKVVEAVNSLQEACGMLAKT
NASP-2

E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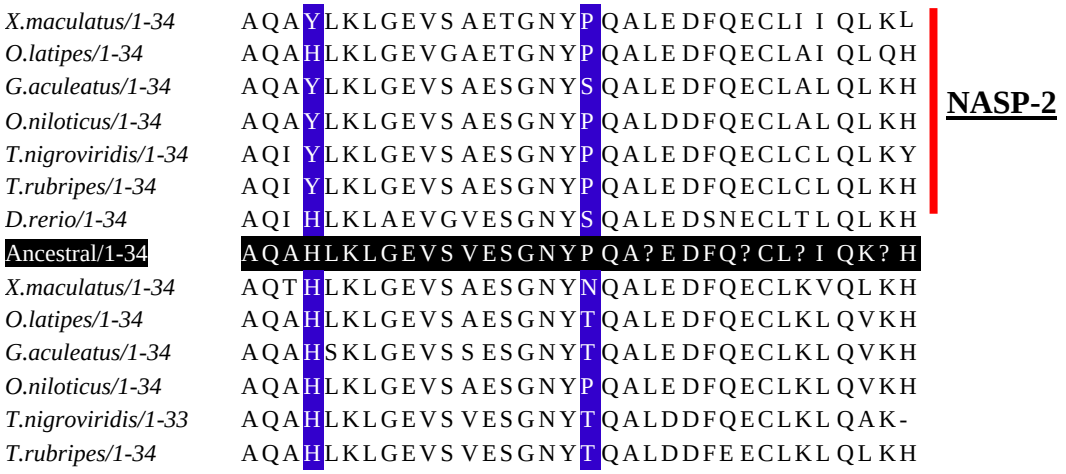
G.aculeatus/1-34 AEAFFL CGKSLLELAR---LQLAWEMLEVAKVIYKRK
O.niloticus/1-34 GEAFFF CGKSLLELAR---LQLAWEMLEVAKVIYKRK
T.nigroviridis/1-34 GEALFL CGKSLLELAR---LQLAWEMLEVAKVIYKRK
T.rubripes/1-34 GEALFL CGKSLLELAR---LQLAWEMLEVAKVIYKRK
D.rerio/1-34 GEVFFF CGKALLELAR---LRLAWEMLEVAKVIYKRK
Ancestral/1-34 GEAFFF YGKSLLELAR---LQLAWEML?LAK? I? LR?
X.maculatus/1-34 GEAFYW CGKALLDLAR---LQLAWEMLEVAKVIYRRK
O.latipes/1-34 GEAFLW CGKALLDLAR---LQLAWEMLEVAKSIYKRK
G.aculeatus/1-34 GEAFFW CGKALLDLAR---LQLAWEMLEVAKVIYKRK
O.niloticus/1-34 GEAFFW YGKALLDLAR---LQLAWEMLEVAKVIYKRK
T.nigroviridis/1-34 GEAFFW CGKALLDLAR---LQLAWEMLEVAKVIYKRK
T.rubripes/1-34 GEAFFW CGKALLDLAR---LQLAWEMLEVAKVIYKRK
NASP-2

F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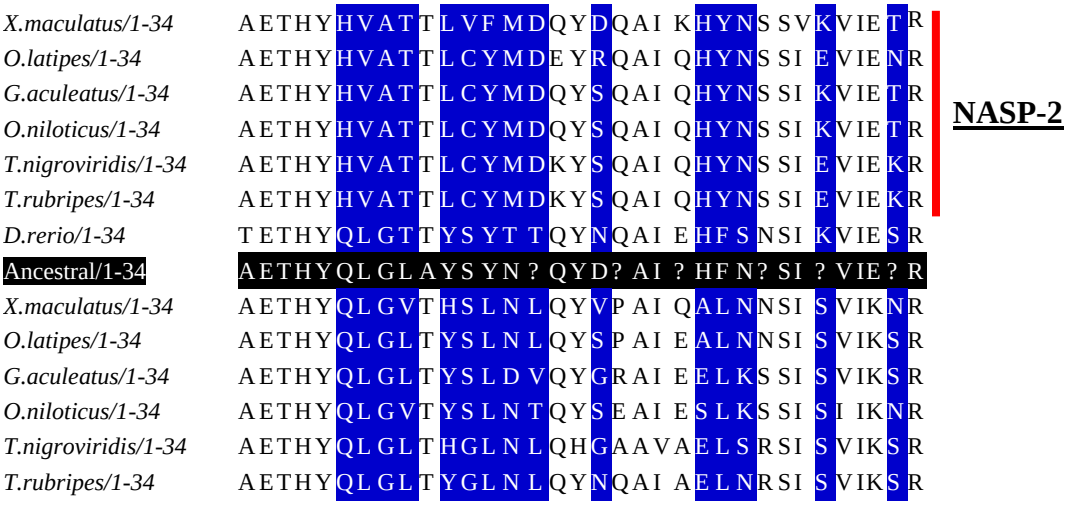
G.aculeatus/1-34 AQAYLKLGEVSAESGNYSQALEDFQECLALQLKH
O.niloticus/1-34 AQAYLKLGEVSAESGNYPQALDDFQECLALQLKH
T.nigroviridis/1-34 AQIYLKLGEVSAESGNYPQALEDFQECLCLQLKY
T.rubripes/1-34 AQIYLKLGEVSAESGNYPQALEDFQECLCLQLKH
D.rerio/1-34 AQIHLKLAEVGVESGNYSQALEDSNECLTLQLKH
Ancestral/1-34 AQAHLKLGEVSVESGNYPQA?EDFQ?CL?IQK?H
X.maculatus/1-34 AQTHLKLGEVSAESGNYNQALEDFQECLKVQLKH
O.latipes/1-34 AQAHLKLGEVSAESGNYTQALEDFQECLKLQVKH
G.aculeatus/1-34 AQAHSKLGEVSSESGNYTQALEDFQECLKLQVKH
O.niloticus/1-34 AQAHLKLGEVSAESGNYPQALEDFQECLKLQVKH
T.nigroviridis/1-33 AQAHLKLGEVSVESGNYTQALDDFQECLKLQAK-
T.rubripes/1-34 AQAHLKLGEVSVESGNYTQALDDFEECLKLQLKH
NASP-2

G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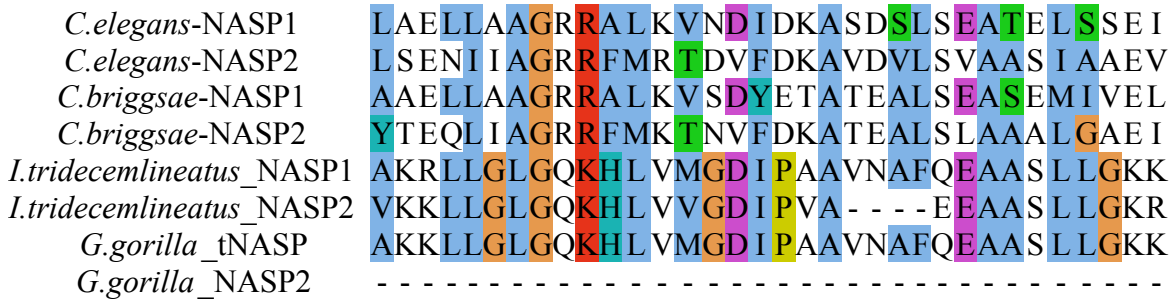
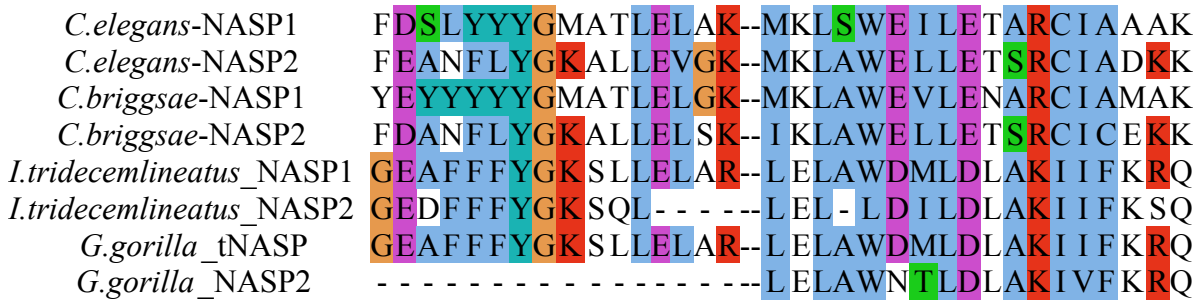
O.niloticus/1-34 AETHYHVATTLCYMDQYSQAIQHYNSSIKVIETR
T.nigroviridis/1-34 AETHYHVATTLCYMDKYSQAIQHYNSSIEVIEKR
T.rubripes/1-34 AETHYHVATTLCYMDKYSQAIQHYNSSIEVIEKR
D.rerio/1-34 TETHYQLGTTYSYTTQYNQAIEHFSNSIKVIESR
Ancestral/1-34 AETHYQLGLAYSYN?QYD?AI?HFN?SI?VIE?R
X.maculatus/1-34 AETHYQLGVTHSLNLQYVPAIQALNNSISVIKNR
O.latipes/1-34 AETHYQLGLTYSLNLQYSPAIEALNNSISVIKSR
G.aculeatus/1-34 AETHYQLGLTYSLDVQYGRAIEELKSSISVIKSR
O.niloticus/1-34 AETHYQLGVTYSLNTQYSEAIESLKSSISIIKNR
T.nigroviridis/1-34 AETHYQLGLTHGLNLQHGAAVAELSRSISVIKSR
T.rubripes/1-34 AETHYQLGLTYGLNLQYNQAIAELNRSISVIKSR
NASP-2

H


C.elegans-NASP1
C.elegans-NASP2
C.briggsae-NASP1
C.briggsae-NASP2
I.tridecemlineatus_NASP1
I.tridecemlineatus_NASP2
G.gorilla _tNASP
G.gorilla _NASP2

I


C.elegans-NASP1
C.elegans-NASP2
C.briggsae-NASP1
C.briggsae-NASP2
I.tridecemlineatus_NASP1
I.tridecemlineatus_NASP2
G.gorilla _tNASP
G.gorilla _NASP2

J


C.elegans-NASP1
C.elegans-NASP2
C.briggsae-NASP1
C.briggsae-NASP2
I.tridecemlineatus_NASP1
I.tridecemlineatus_NASP2
G.gorilla _tNASP
G.gorilla _NASP2

K


C.elegans-NASP1
C.elegans-NASP2
C.briggsae-NASP1
C.briggsae-NASP2
I.tridecemlineatus_NASP1
I.tridecemlineatus_NASP2
G.gorilla _tNASP
G.gorilla _NASP2