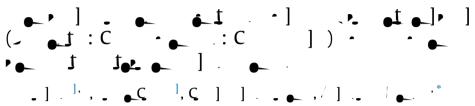


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ABSTRACT

1. Introduction

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الراب المرابع المرابع المنظم على المرابع المرابع المرابع المرابع المرابع المرابع المرابع المرابع المرابع] **. .** f] ,, 2013; [] [] ,, 2014). A [] [] ... **....**] 1, , , , , , 1 • · • • · ·] •]]t] (, t] ,, 2004; t] ,, 2012; عورين أوران المناز والمناز وال ·].] .-], · 🛌 🕽] D A (JD A).]. •] . • J.]t.]•/ f] • . fD A.].] . .] **[** _ [[[[• .]f • • •] .. (. • f] ., 2008). [•A dt t] D A]t] _ _ **[•**]] . . .],] , (2014) _ [21. . . [••]]] j] **j**] 🚉 12 A. . A .]]] J • 1 . • • Schizopygopsis malacanthus JD A. t. 1 1.1 Ţ j,]j] ... 32. , ... 8.]] ... _ 1 _ _ 1

2. Materials and methods

2.1. Sample collection and DNA extraction

2.2. Primer design, PCR amplification, and sequencing

)]. J	. •-	/ · · · · · (5′-3′)		· •- *
1	tRNA ^{Phe} -12S rRNA	_A CAA. AAA CA_ CAC_	C AC C C. A A CC	. <u>.</u> [].(2014)
2	12S rRNA -16S rRNA	AA A AA. AAA AA	CAACCA C.A. ACCAC .A	. [2014] . (2014)
3	16S rRNA-16S rRNA	AACCC _C_C_ CAAA A _	A CLCCA A LCLCC LCLL	1.1
4	16S rRNA-16S rRNA	ACC CAAA A C AACAC	ACA ALA AAACL ACCL ALL (2014)
5	16S rRNA- tRNA ^{Gln}	CA CC C_AAAC	_A AADA A CAC	. [2014] . (2014)
6	tRNA ^{Gln} - tRNA ^{Asn}	_A AAA AA AACCCA_	C C.JA C. JAACJAA A	. <u>.</u> <u>.</u> <u>.</u> [] . (2014)
7	ND2-COII	ACA_CC_CA_AC_CACCACC_A	A_A A _CAAA CCCA A_	1.1
8	COII- tRNA ^{Lys}	CAA AC C C CACC	CACCA C CAAA CC A (2014)
9	tRNA ^{Lys} -COIII	A C _ CCAA CC AA	_CA' C D _C AC A_	. <u>.</u> <u>.</u> <u>.</u> [] . (2014)
10	COIII- tRNA ^{Gly}	JAAJ C. CACCAA CACA C	CC AACCAA AC_	. J].(2014)
11	COIII-ND4L	A AC AAAC CAC	A C.A CC.CACAA CA AA	. 1.1
12	tRNA ^{Arg} -ND4	AA A C C. AC. C.	C C CC AAD C A (2014)
13	ND4-ND4	CC_C_ A_ CCA_	AL LA C LLACLA LAA L LCC	. 1.1
14	ND4-ND5	- CA A- AC -C	A_AA_ C_CC A CA A	1.1
15	ND5-ND5	A CC ACA.AAC ACC	CC AAA	1.1
16	ND5- tRNA ^{Glu}	A C . C A . A.	C A C CA (2014)
17	ND6- Cytb	CC AA_AA CAAA AC_AC	C AAA .CC.C .	1.1
18	Cytb- D-loop	CCCCACCCA.AC ACA.	C CAC.ACA.	. 1.1
19	D-loop-12S rRNA	CACCC _ C_CCCAAA C A	. C AC., CA., AA	1.1

• f(x) := A/x; f(

2.3. Sequence editing and analysis

2.4. Phylogenetic analyses

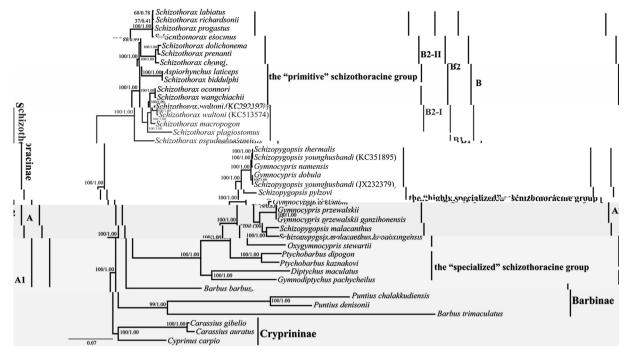
3. Results

3.1. General features of S. malacanthus mtDNA achieved in this study

3.2. Mitogenomic dataset characteristics

3.3. Phylogenetic

c. lw6mitoch1(ot)topo327/F5ngothe 13 stkelihood 6-



```
Diptychus maculatus ] Gymnodiptychus pachycheilus [] - - -
                                              A2 • _ _ f _ _ f _ _ _ • _ _ f _ . Ptychobarbus ] ] _ _ .
                                                                               (Gymnocypris, Oxygymnocypris, ] Schizopygopsis). 2
                                                . [[t .
                                                                                                                                     Gymnocypris ] Schizopygopsis ( = 1.0, B = 100). f \rightarrow fi \rightarrow fi \rightarrow f
          t [] Gymnocypris ] Schizopygopsis ] ] t
                                                                                                                                                                                    , f.
                                                                                                                                                                                                                                            Gymnocypris
eckloni, Gymnocypris przewalskii, ] Gymnocypris przewalskii ganzihonensis. G. eckloni ] G. przewalskii ] t t] ]
     = 0.83, B = 79) [ ] [ ] . ] fi f , [ G. przewalskii ganzihonensis ( = 1.0, B = 100) ]. . . [ ] ] . . .
              f_{\bullet} \bullet D A [f] f (37 ...), f_{\bullet} \circ f_{\bullet} 
ganzihonensis ( = 0.84, B = 78), ]. \downarrow - ( = 1.0, B = 100) ]. \downarrow 1 ] ] . \downarrow 1
DA]t]. t. ___t t]t. . _Gymnocypris] Schizopygopsis
     ] 💪 Schizopygopsis young-
                                                                                                                                                                                 ب أب
husbandi , ]. __t . S. younghusbandi ( B] / __ C351895) ] Schizopygopsis thermalis, ]. __ ] S. young-
▶ ] B2 (C] B2- ] B2- / .2] A 1). ▶ ] B2- , Schizothorax plagiostomus
     Schizothorax macropogon, Schizothorax waltoni, Schizothorax
oconnori, ] Schizothorax wangchiachii ( = 1.0, B = 100); ] \downarrow 1 ] III 1 \downarrow , , 1 ] ] \downarrow S.
waltoni S. oconnori ] S. wangchiachii ( = 1.0, B = 100). L C ] B2-, A. laticeps ] Schizothorax biddulphi ]
        f. f. Schizothorax dolichonema ] Schizothorax prenanti ] . f. f] ] ( = 1.0, B = 100) f ]f. ].
fi f , t Schizothorax chongi. Schizothorax esocinus, Schizothorax progastus, Schizothorax richardsonii, Schizothorax
labiatus 👞
                                    ] .
                                                                                                    f = 1.0, B = 100, f = 100
                                                                                                                                                                                                                                          ] 1 ____
                                                                                                                                                                          t
                                                                                                                                                                                                        ■ B. barbus ] • ] • • ■
```

4. Discussion

_]]**j** 1..1 [t_ [· [_ t_ f] ,, 1981; f] ,, 2012), f, _f] ,f , f , f , f , (2013)] _ [, [] ,[] .(2014). ٠ [٠ ٠ + ١] _•] , t (C] __t] ., 1981).] f, _ ,] fi _ , _ , _ , _ , _] _t. _t__] j , 2014). ساها المهلم عن الها الله الله الله الله 1) [•[• 1•

