
Supplementary material

Systematics of the genus *Halgerda* Bergh, 1880 (Heterobranchia : Nudibranchia) of Mozambique with descriptions of six new species

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Figure S1. H3 BI tree

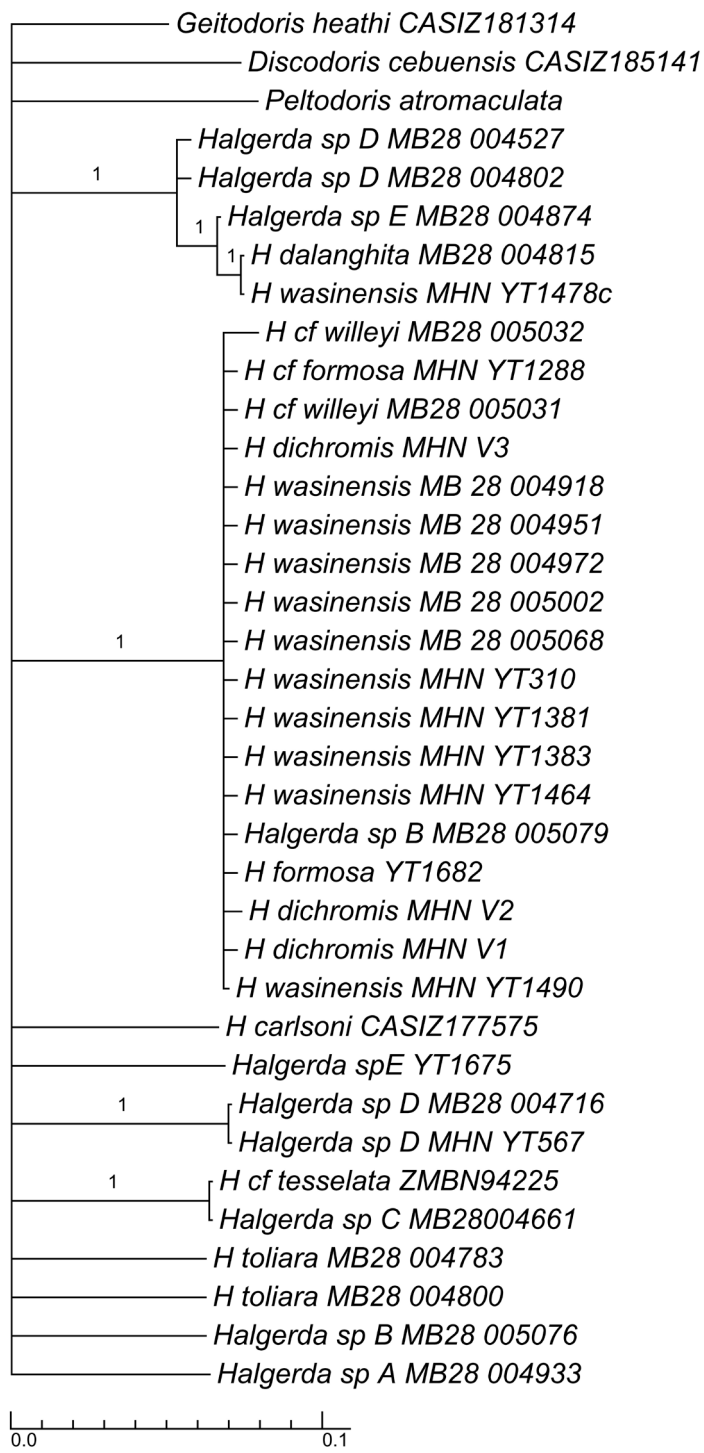


Figure S2. Concatenate H3 ML tree

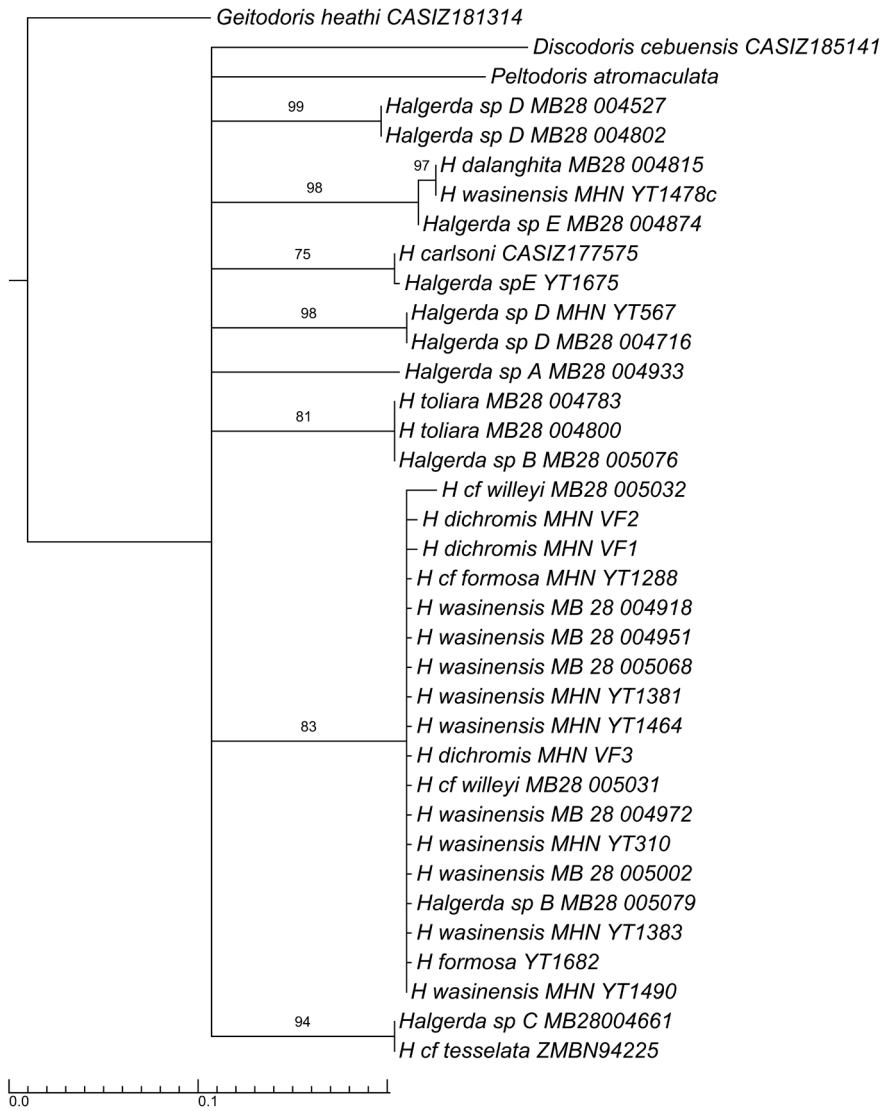


Figure S3. 16S BI tree after GBlock treatment

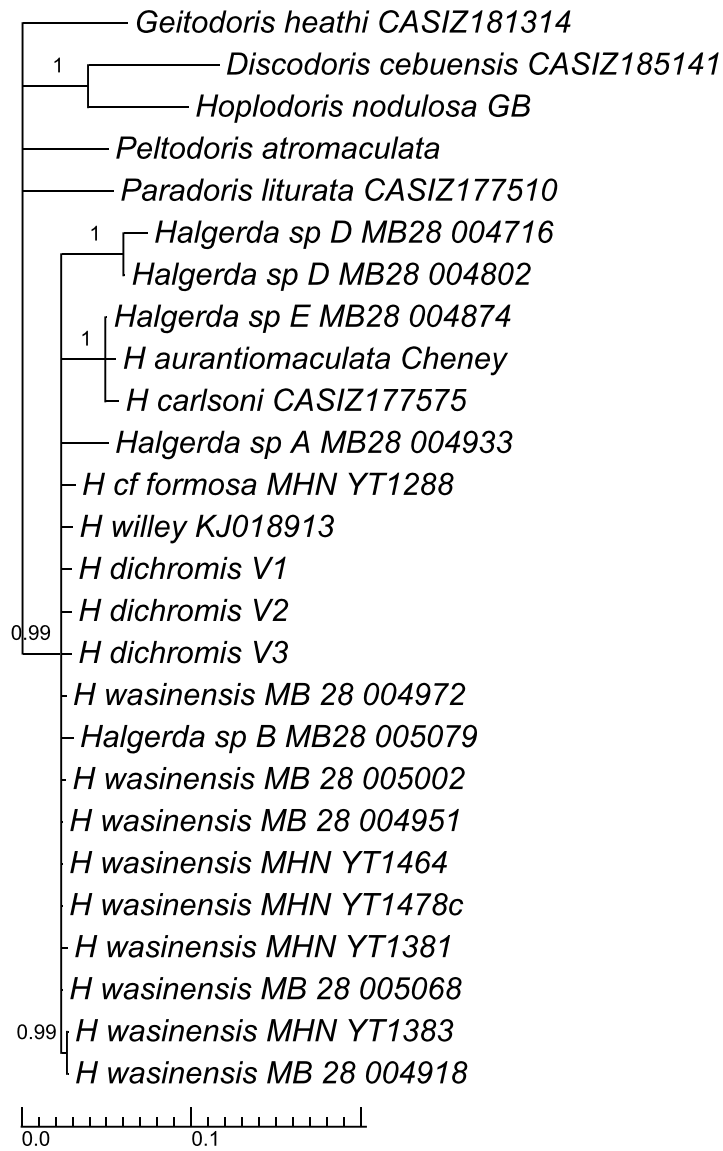


Figure S4. 16S ML tree after GBlock treatment

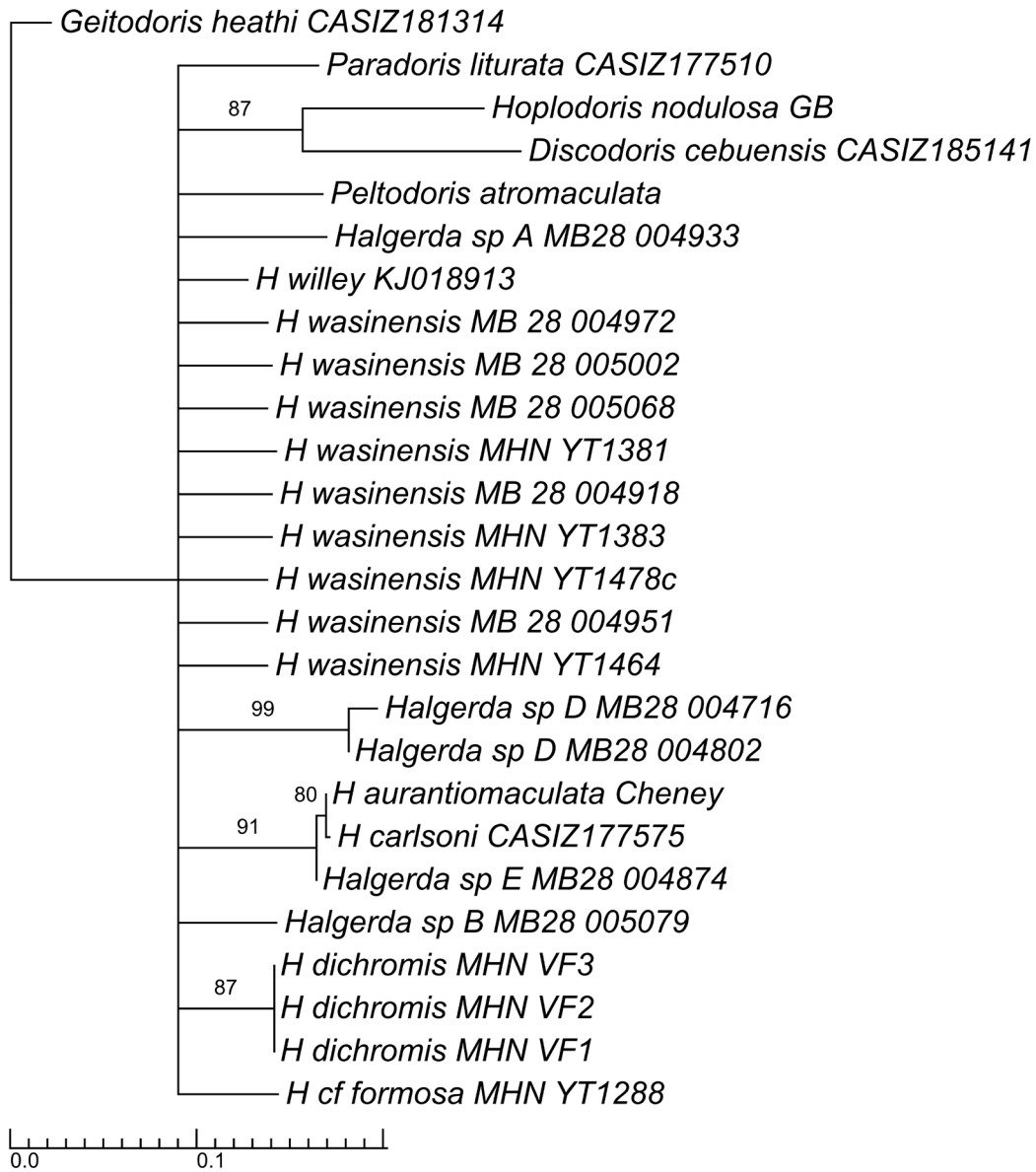


Figure S5. 16S ML tree without pruning

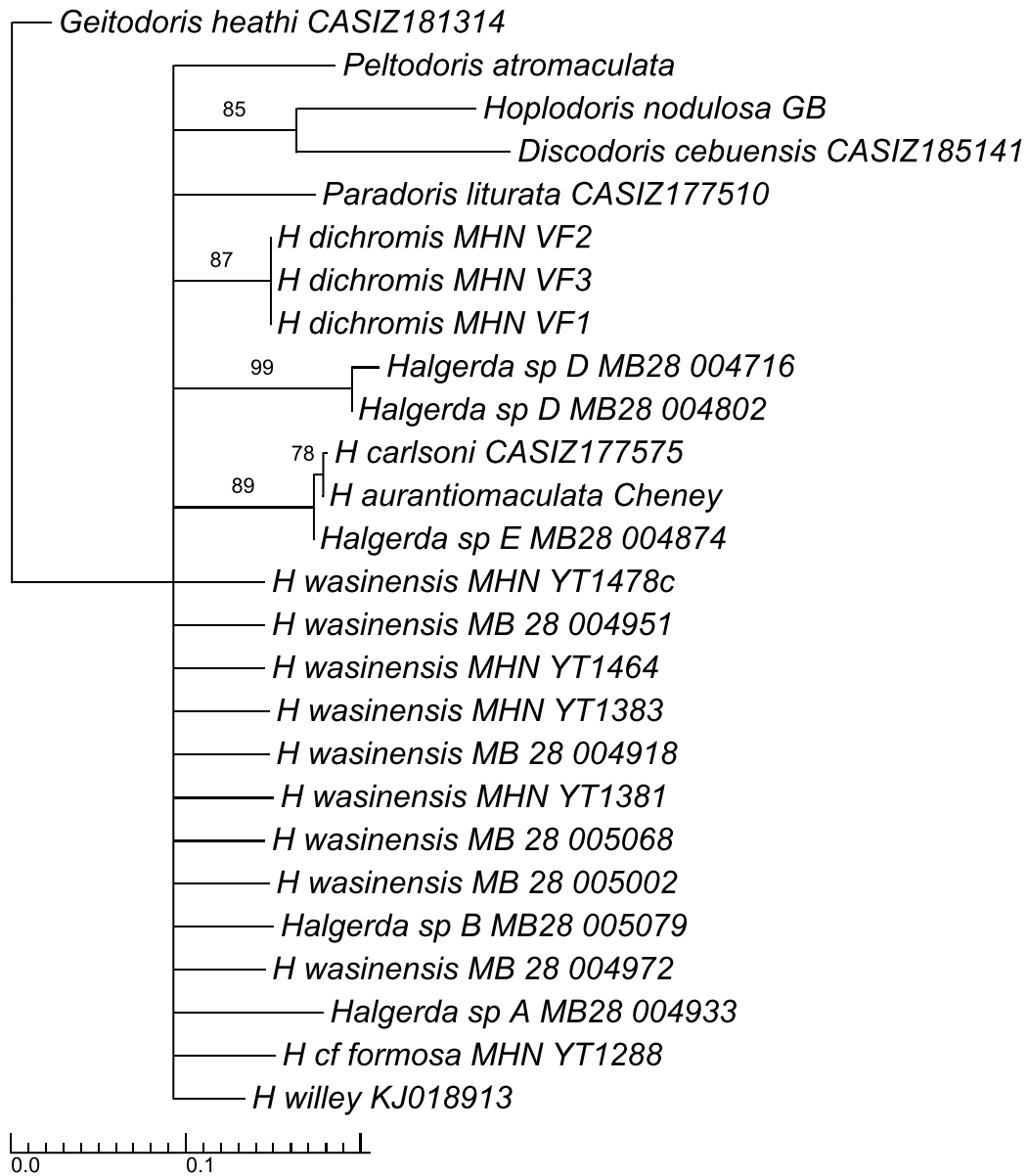


Figure S6. 16S BI tree without pruning

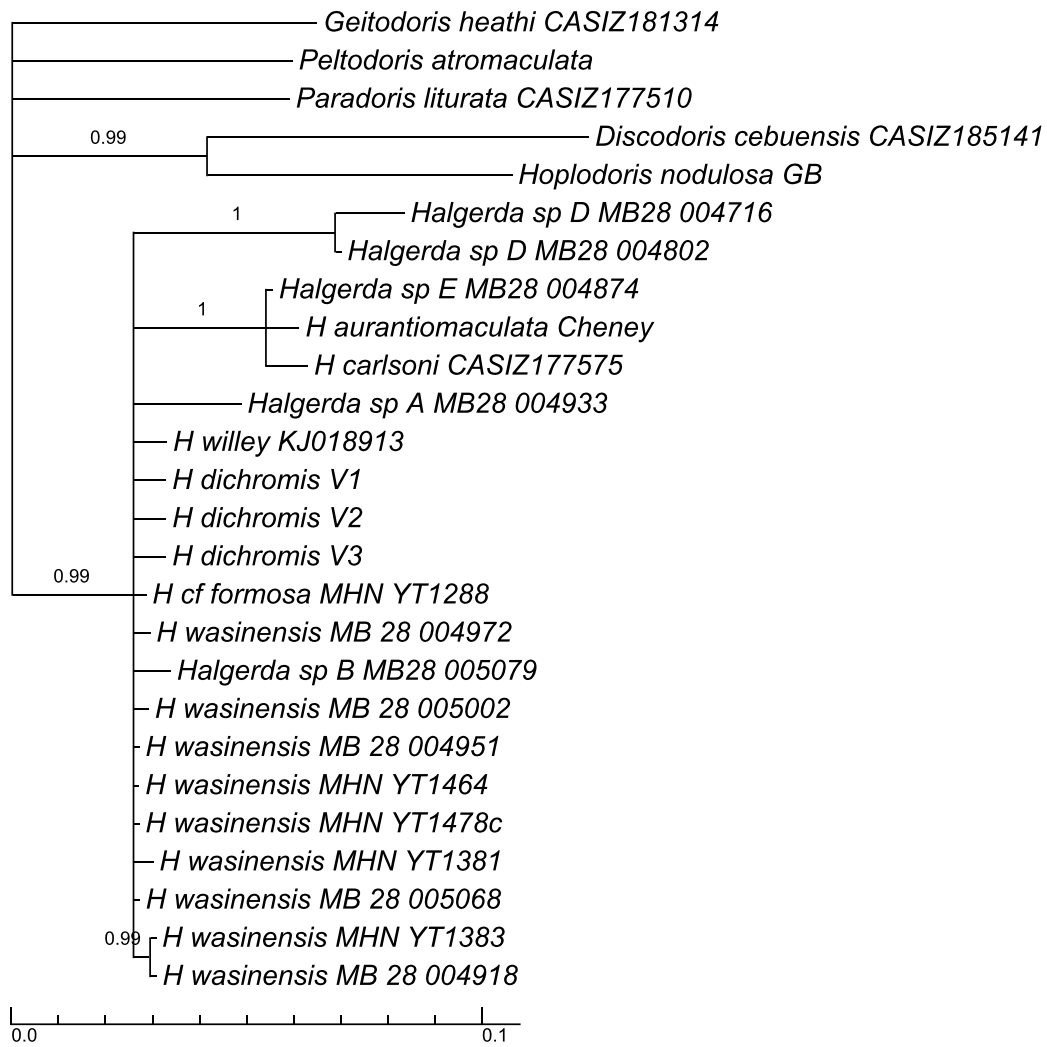


Figure S7. Concatenate COI+H3+16S with min. of two marks BI tree

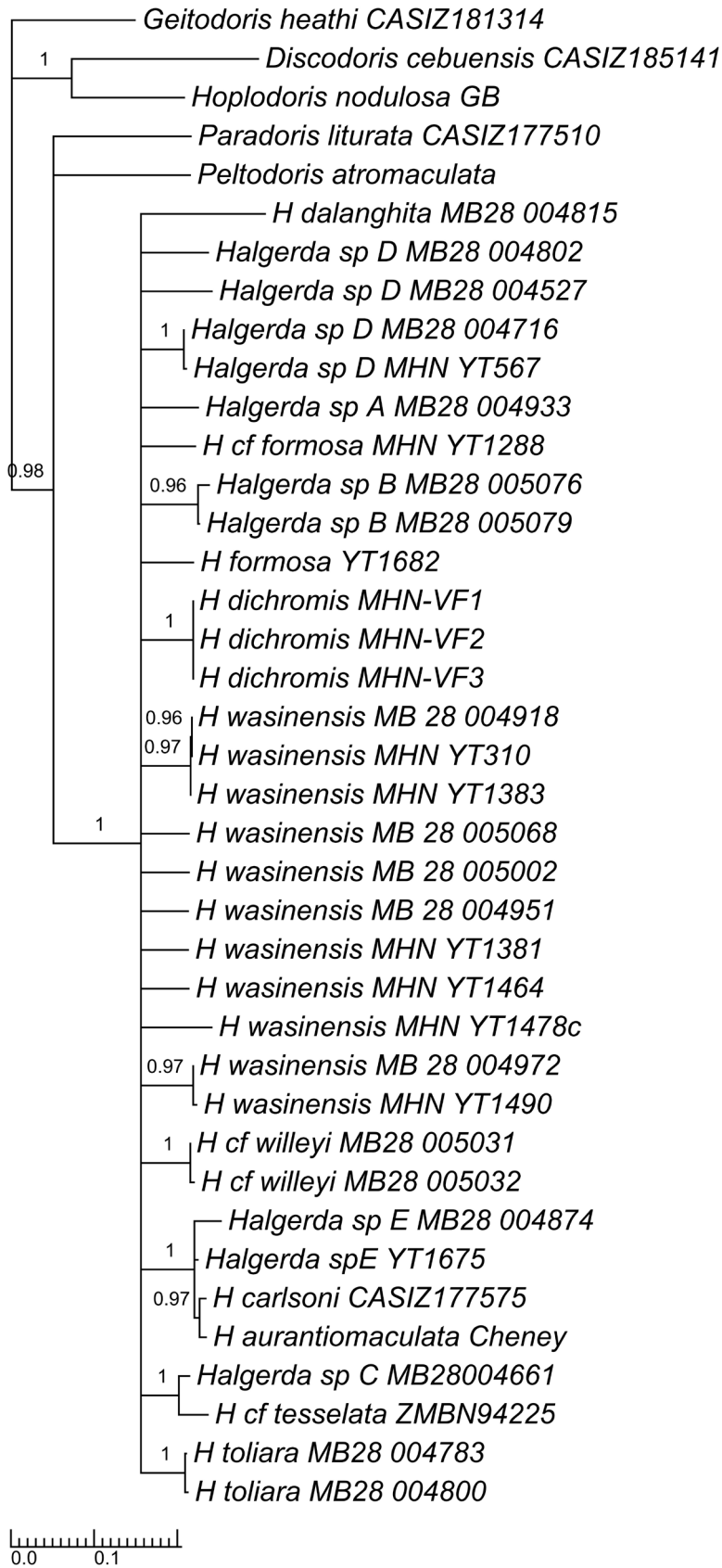


Figure S8. Concatenate COI+H3+16S with min. of two marks ML tree

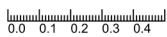
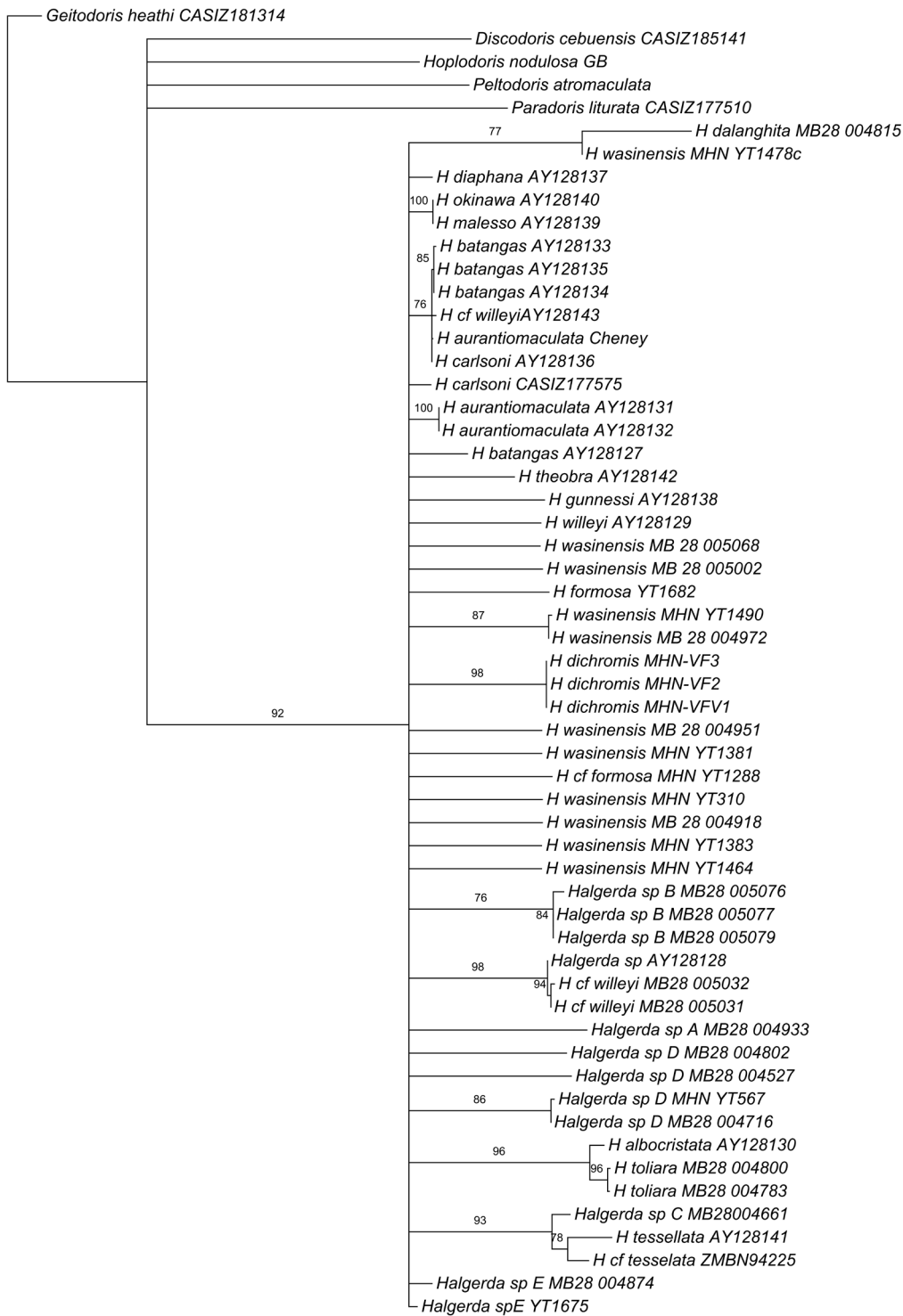
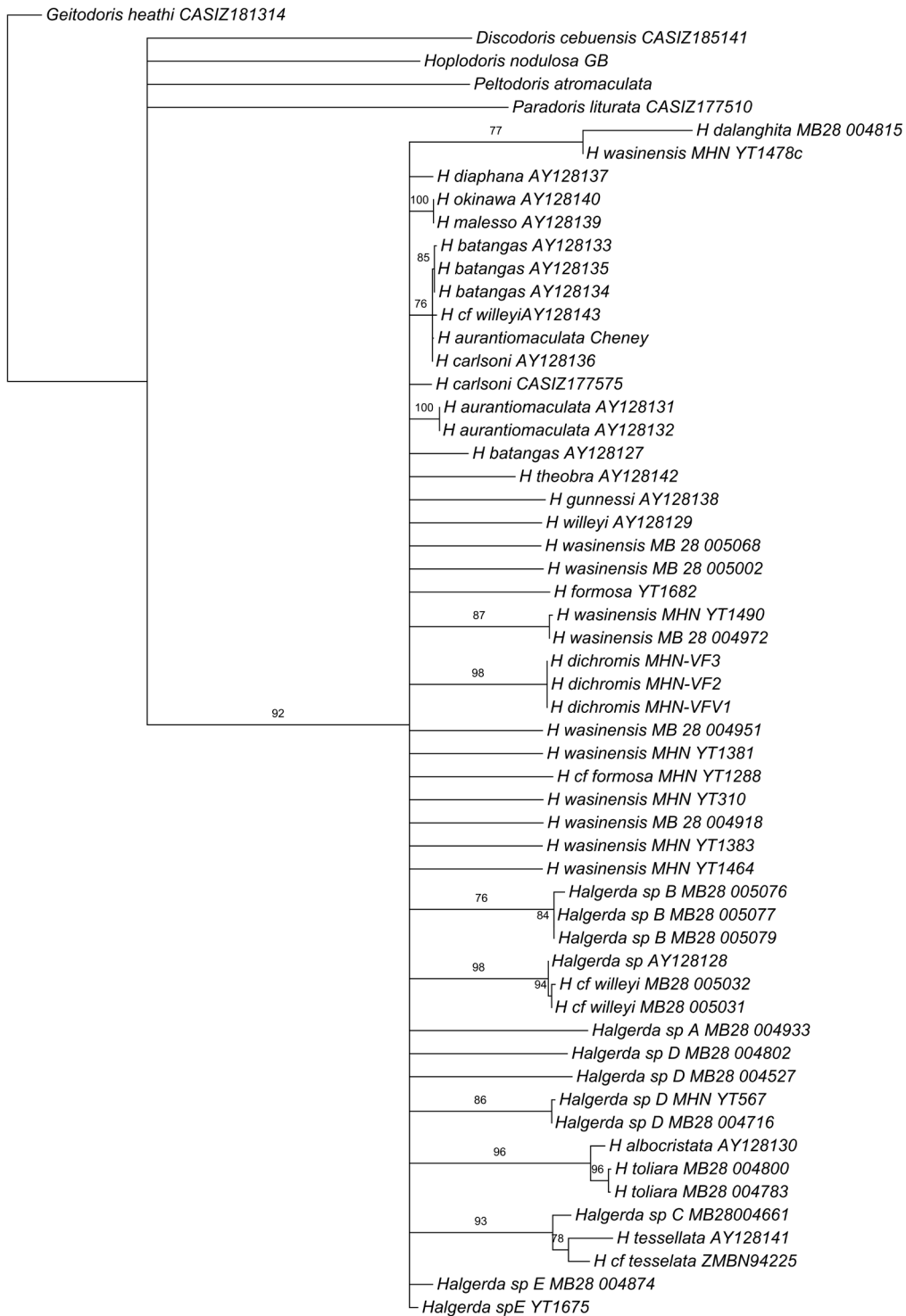


Figure S9. Concatenate COI+16S ML tree



0.0 0.1 0.2 0.3 0.4

Figure S10. COI BI tree

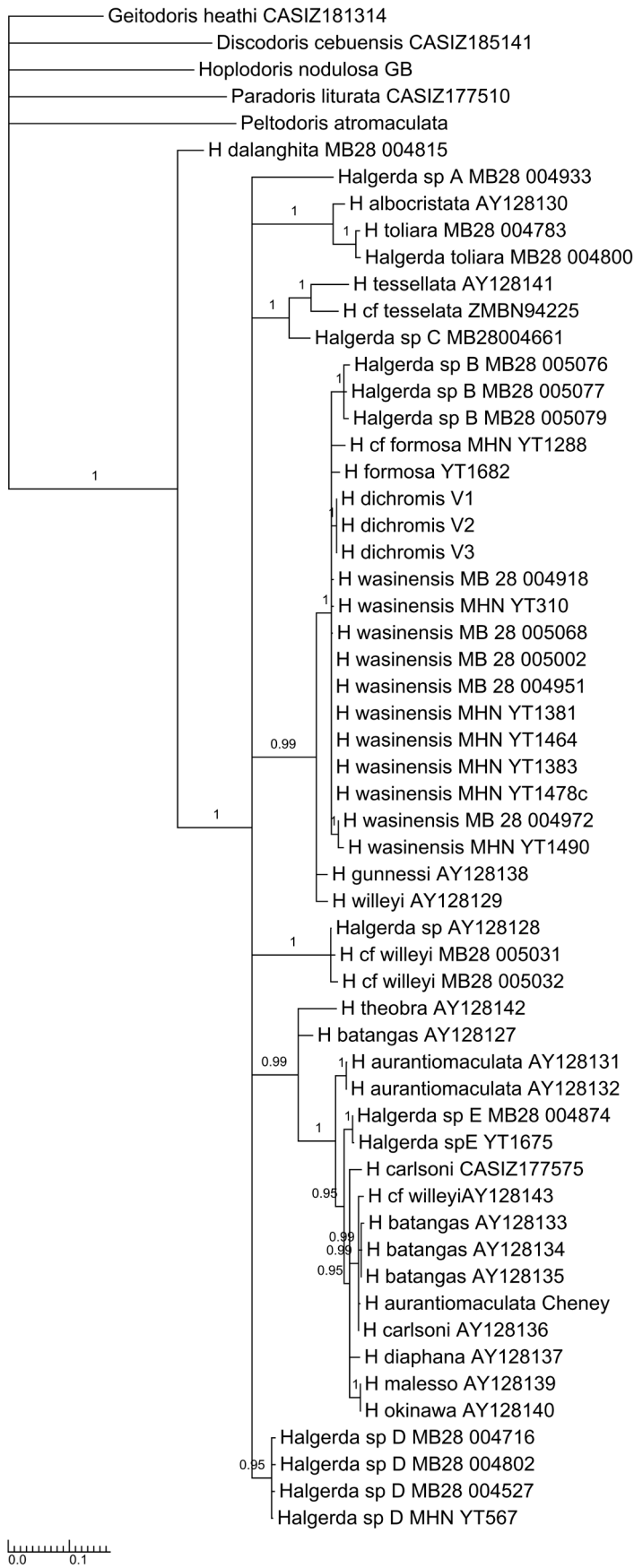


Figure S11. COI ML tree

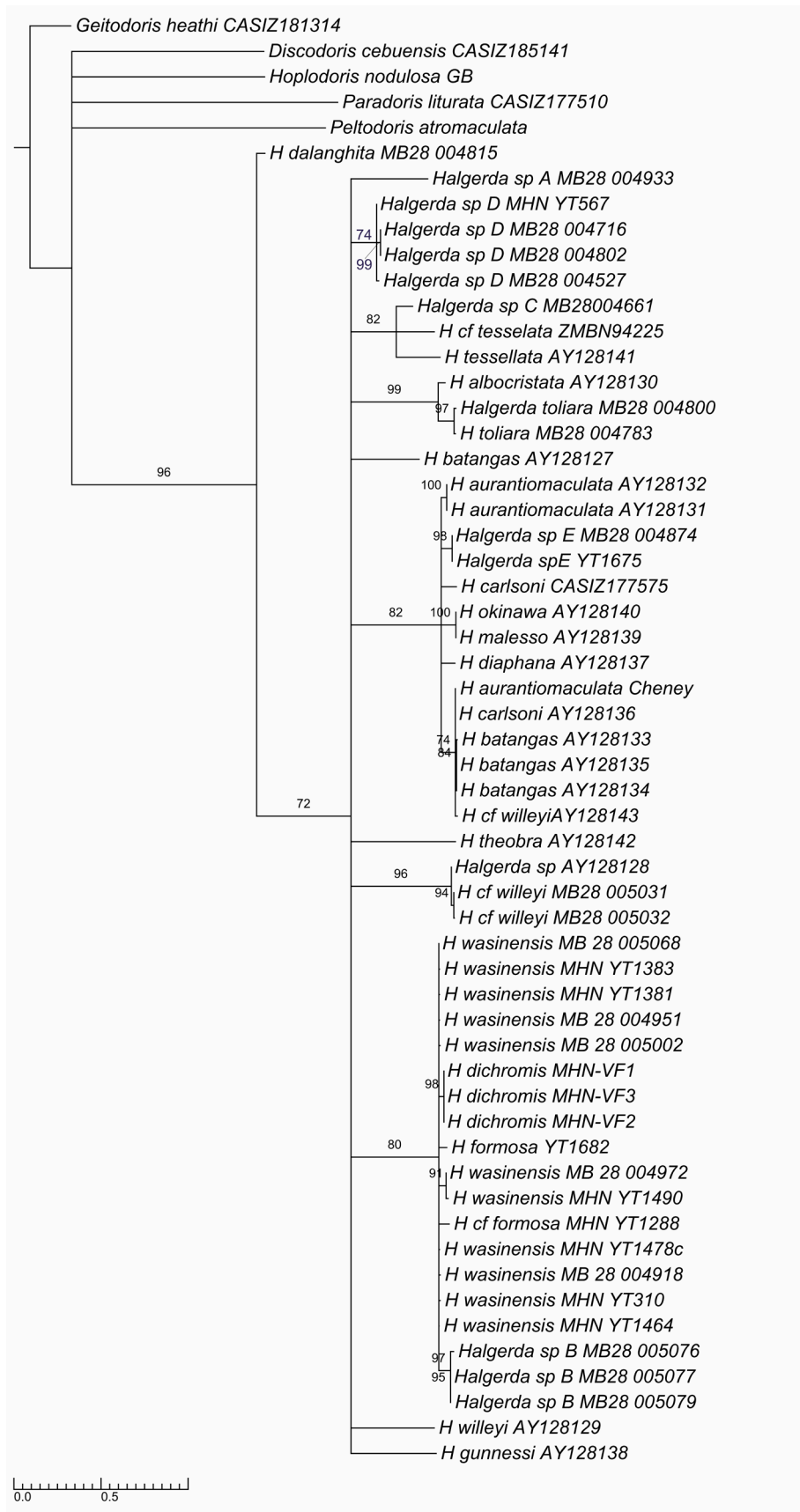


Figure S12. Concatenate COI+H3 BI tree

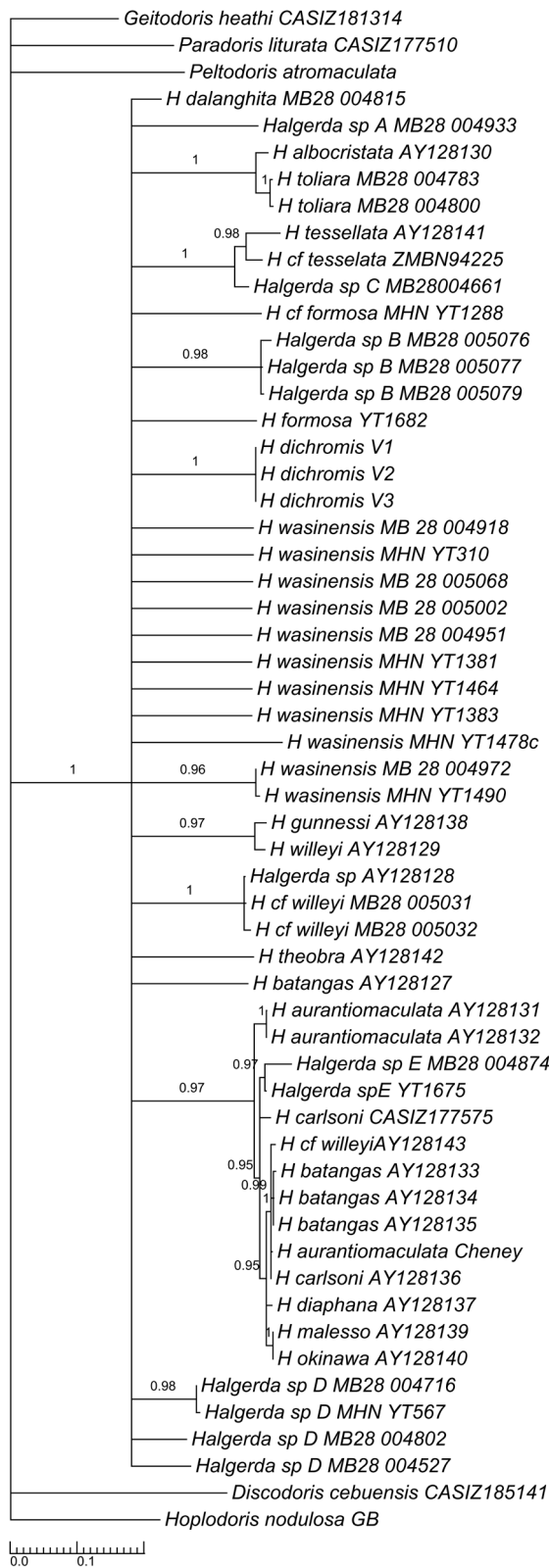


Figure S13. Concatenate COI+H3 ML tree

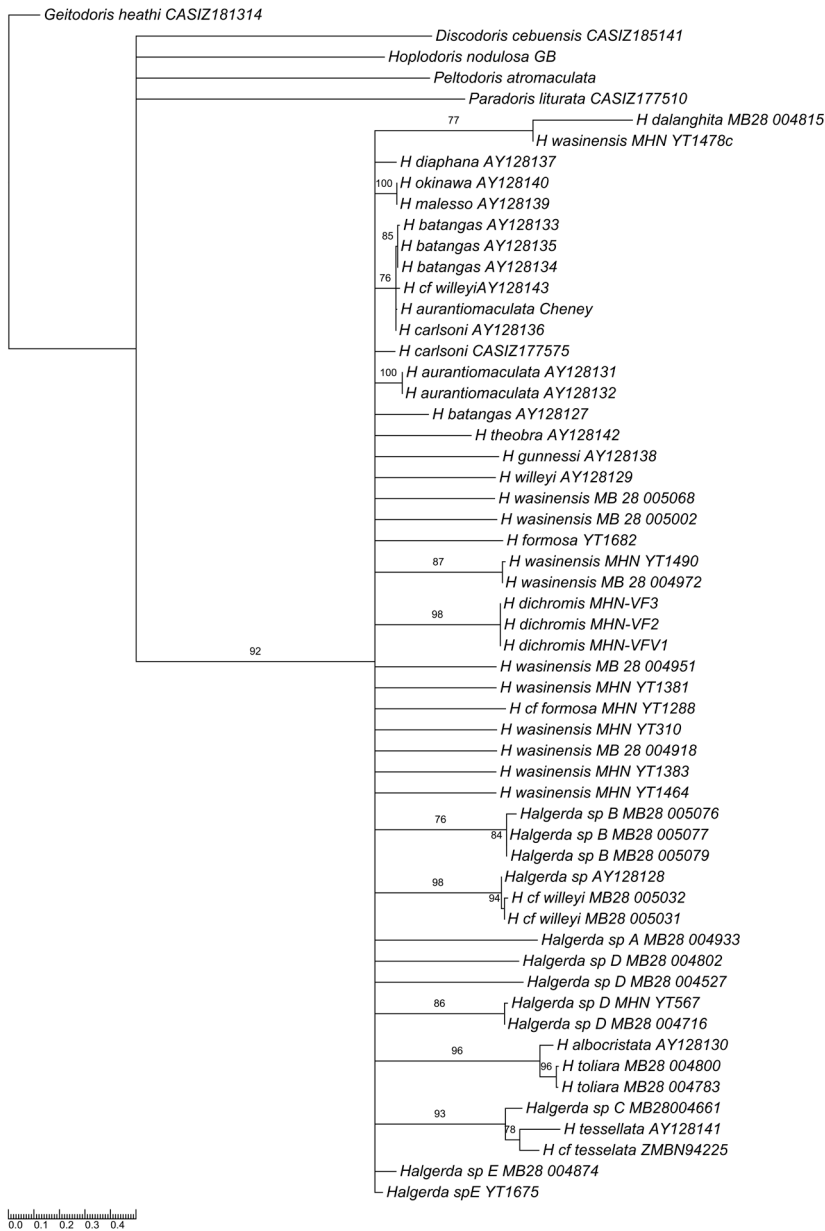


Figure S14. *Halgerda dichromis* (MHN-VF3) reproductor system and scanning electron microscope of radula (A. centra region, B. lateral teeth, C. left side outermost teeth, D. wright side outermost teeth).

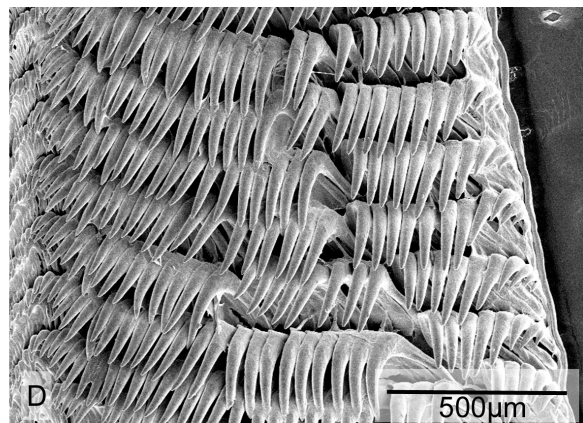
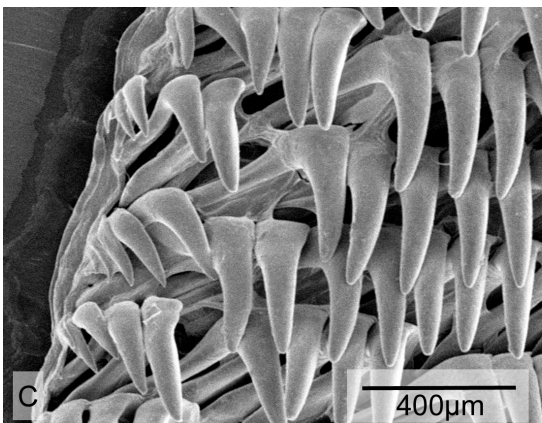
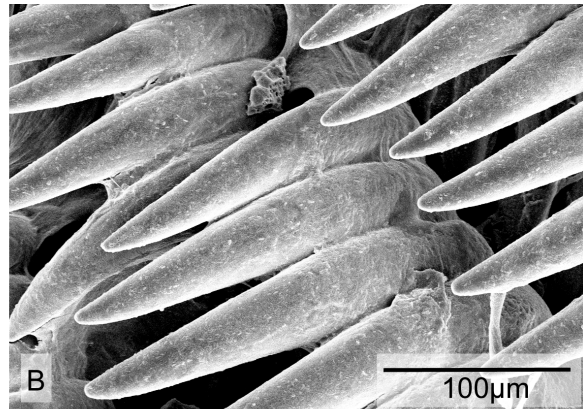
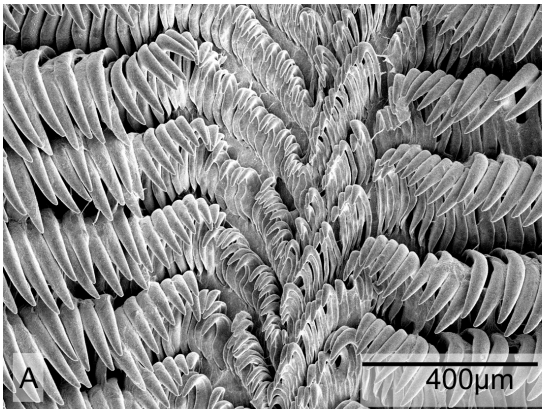
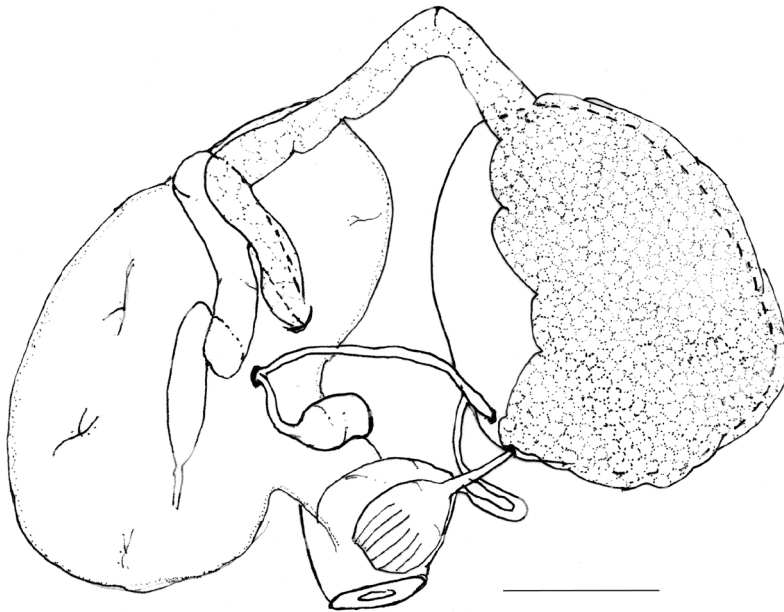


Table S1. ABGD Results

Partition 1 : found 30 groups (prior maximal distance P= 0.001000)
Partition 2 : found 30 groups (prior maximal distance P= 0.001668)
Partition 3 : found 27 groups (prior maximal distance P= 0.002783)
Partition 4 : found 23 groups (prior maximal distance P= 0.004642)
Partition 5 : found 15 groups (prior maximal distance P= 0.007743)
Partition 6 : found 15 groups (prior maximal distance P= 0.012915)
Partition 7 : found 3 groups (prior maximal distance P= 0.021544)
Partition 8 : found 1 groups (prior maximal distance P= 0.035938)

Partition with prior maximal distance P=4.64e-03
Distance K80 Kimura MinSlope=1.200000

Group[1] n: 1 ;id: H_dalanghita_MB28_004815
Group[2] n: 1 ;id: Halgerda_sp_A_MB28_004933
Group[3] n: 1 ;id: H_albocristata_AY128130
Group[4] n: 2 ;id: H_toliara_MB28_004783 Halgerda_toliara_MB28_004800
Group[5] n: 3 ;id: Halgerda_sp_B_MB28_005076 Halgerda_sp_B_MB28_005077
Halgerda_sp_B_MB28_005079
Group[6] n: 1 ;id: H_theobra_AY128142
Group[7] n: 1 ;id: H_batangas_AY128127
Group[8] n: 2 ;id: H_aurantiomaculata_AY128131 H_aurantiomaculata_AY128132
Group[9] n: 3 ;id: Halgerda_sp_AY128128 H_cf_willeyi_MB28_005031
H_cf_willeyi_MB28_005032
Group[10] n: 4 ;id: Halgerda_sp_D_MB28_004716 Halgerda_sp_D_MB28_004802
Halgerda_sp_D_MB28_004527 Halgerda_sp_D_MHN_YT567
Group[11] n: 1 ;id: H_tessellata_AY128141
Group[12] n: 1 ;id: Halgerda_sp_C_MB28004661
Group[13] n: 1 ;id: H_cf_tesselata_ZMBN94225
Group[14] n: 1 ;id: H_cf_formosa_MHN_YT1288
Group[15] n: 1 ;id: H_formosa_YT1682
Group[16] n: 14 ;id: H_dichromis_V1 H_dichromis_V2 H_dichromis_V3
H_wasinensis_MB_28_004918 H_wasinensis_MHN_YT310
H_wasinensis_MB_28_005068 H_wasinensis_MB_28_005002
H_wasinensis_MB_28_004951 H_wasinensis_MHN_YT1381
H_wasinensis_MHN_YT1464 H_wasinensis_MHN_YT1383
H_wasinensis_MHN_YT1478c H_wasinensis_MB_28_004972
H_wasinensis_MHN_YT1490
Group[17] n: 1 ;id: H_gunnessi_AY128138
Group[18] n: 1 ;id: H_willeyi_AY128129
Group[19] n: 2 ;id: Halgerda_sp_E_MB28_004874 Halgerda_spE_YT1675
Group[20] n: 1 ;id: H_carlsoni_CASIZ177575
Group[21] n: 6 ;id: H_cf_willeyiAY128143 H_batangas_AY128133
H_batangas_AY128134 H_batangas_AY128135 H_aurantiomaculata_Cheney
H_carlsoni_AY128136
Group[22] n: 1 ;id: H_diaphana_AY128137
Group[23] n: 2 ;id: H_malesso_AY128139 H_okinawa_AY128140

Partition with prior maximal distance P=7.74e-03
Distance K80 Kimura MinSlope=1.200000

Group[1] n: 1 ;id: H_dalanhita_MB28_004815
Group[2] n: 1 ;id: Halgerda_sp_A_MB28_004933
Group[3] n: 1 ;id: H_albocristata_AY128130
Group[4] n: 2 ;id: H_toliara_MB28_004783 Halgerda_toliara_MB28_004800
Group[5] n: 19 ;id: Halgerda_sp_B_MB28_005076 Halgerda_sp_B_MB28_005077
Halgerda_sp_B_MB28_005079 H_cf_formosa_MHN_YT1288 H_formosa_YT1682
H_dichromis_V1 H_dichromis_V2 H_dichromis_V3 H_wasinensis_MB_28_004918
H_wasinensis_MHN_YT310 H_wasinensis_MB_28_005068
H_wasinensis_MB_28_005002 H_wasinensis_MB_28_004951
H_wasinensis_MHN_YT1381 H_wasinensis_MHN_YT1464
H_wasinensis_MHN_YT1383 H_wasinensis_MHN_YT1478c
H_wasinensis_MB_28_004972 H_wasinensis_MHN_YT1490
Group[6] n: 1 ;id: H_theobra_AY128142
Group[7] n: 1 ;id: H_batangas_AY128127
Group[8] n: 14 ;id: H_aurantiomaculata_AY128131 H_aurantiomaculata_AY128132
Halgerda_sp_E_MB28_004874 Halgerda_spE_YT1675 H_carlsoni_CASIZ177575
H_cf_willeyi_AY128143 H_batangas_AY128133 H_batangas_AY128134
H_batangas_AY128135 H_aurantiomaculata_Cheney H_carlsoni_AY128136
H_diaphana_AY128137 H_malesso_AY128139 H_okinawa_AY128140
Group[9] n: 3 ;id: Halgerda_sp_AY128128 H_cf_willeyi_MB28_005031
H_cf_willeyi_MB28_005032
Group[10] n: 4 ;id: Halgerda_sp_D_MB28_004716 Halgerda_sp_D_MB28_004802
Halgerda_sp_D_MB28_004527 Halgerda_sp_D_MHN_YT567
Group[11] n: 1 ;id: H_tessellata_AY128141
Group[12] n: 1 ;id: Halgerda_sp_C_MB28004661
Group[13] n: 1 ;id: H_cf_tesselata_ZMBN94225
Group[14] n: 1 ;id: H_gunnessi_AY128138
Group[15] n: 1 ;id: H_willeyi_AY128129

Partition with prior maximal distance P=2.78e-03
Distance K80 Kimura MinSlope=1.200000

Group[1] n: 1 ;id: H_dalanhita_MB28_004815
Group[2] n: 1 ;id: Halgerda_sp_A_MB28_004933
Group[3] n: 1 ;id: H_albocristata_AY128130
Group[4] n: 2 ;id: H_toliara_MB28_004783 Halgerda_toliara_MB28_004800
Group[5] n: 1 ;id: Halgerda_sp_B_MB28_005076
Group[6] n: 1 ;id: H_theobra_AY128142
Group[7] n: 1 ;id: H_batangas_AY128127
Group[8] n: 2 ;id: H_aurantiomaculata_AY128131 H_aurantiomaculata_AY128132
Group[9] n: 3 ;id: Halgerda_sp_AY128128 H_cf_willeyi_MB28_005031
H_cf_willeyi_MB28_005032
Group[10] n: 4 ;id: Halgerda_sp_D_MB28_004716 Halgerda_sp_D_MB28_004802
Halgerda_sp_D_MB28_004527 Halgerda_sp_D_MHN_YT567
Group[11] n: 1 ;id: H_tessellata_AY128141
Group[12] n: 1 ;id: Halgerda_sp_C_MB28004661
Group[13] n: 1 ;id: H_cf_tesselata_ZMBN94225

Group[14] n: 2 ;id: Halgerda_sp_B_MB28_005077 Halgerda_sp_B_MB28_005079
Group[15] n: 1 ;id: H_cf_formosa_MHN_YT1288
Group[16] n: 1 ;id: H_formosa_YT1682
Group[17] n: 3 ;id: H_dichromis_V1 H_dichromis_V2 H_dichromis_V3
Group[18] n: 9 ;id: H_wasinensis_MB_28_004918 H_wasinensis_MHN_YT310
H_wasinensis_MB_28_005068 H_wasinensis_MB_28_005002
H_wasinensis_MB_28_004951 H_wasinensis_MHN_YT1381
H_wasinensis_MHN_YT1464 H_wasinensis_MHN_YT1383
H_wasinensis_MHN_YT1478c
Group[19] n: 1 ;id: H_wasinensis_MB_28_004972
Group[20] n: 1 ;id: H_wasinensis_MHN_YT1490
Group[21] n: 1 ;id: H_gunnessi_AY128138
Group[22] n: 1 ;id: H_willeyi_AY128129
Group[23] n: 2 ;id: Halgerda_sp_E_MB28_004874 Halgerda_spE_YT1675
Group[24] n: 1 ;id: H_carlsoni_CASIZ177575
Group[25] n: 6 ;id: H_cf_willeyiAY128143 H_batangas_AY128133
H_batangas_AY128134 H_batangas_AY128135 H_aurantiomaculata_Cheney
H_carlsoni_AY128136
Group[26] n: 1 ;id: H_diaphana_AY128137
Group[27] n: 2 ;id: H_malesso_AY128139 H_okinawa_AY12814



Table S2. Diagnostic characters

Species	Compared to	Nucleotides diagnostics COI	Nucleotides diagnostics 16S	Nucleotides diagnostics H3
<i>H. cf. formosa</i>	<i>H. wasinensis</i>	360T, 399A, 414T, 444A, 462G, 547T	N/A	None
<i>H. wasinensis</i>	<i>H. drichomis</i>	399A, 348C, 375C	195T, 293C	None
<i>H. wasinensis</i> var.- <i>wasinensis-dichromis</i>	<i>H. cf. formosa</i>	399T, 414C	N/A	None
<i>H. wasinensis</i> var.	<i>H. wasinensis</i>	156C, 270C, 357A, 360T, 384A, 405C, 548T	141G*, 159A, 162T, 164gap*, 286G*	None
<i>H. wasinensis</i> var.	<i>H. wasinensis-dichromis</i>	270T, 357G, 360C, 384G	141G*, 162T, 164gap*, 195T, 286G*, 293C	None
<i>Halgerda toliara</i>	<i>H. albocristata</i>	42A, 54G, 135G, 138C, 174C, 207C, 273A, 279G, 282A, 312T, 318G, 324G, 330G*, 339G, 348G, 351G, 405A, 438A, 462G, 463G, 469T, 471G, 483A, 487C, 516C, 531T, 546A	N/A	N/A (compared to <i>H. carlsoni</i> : 75A, 85G, 106A, 199C)
<i>H. dalanghita</i>	<i>H. leopardalis</i> sp. nov.	126T, 129A, 135G, 138T, 150A, 153A*, 159A, 175C, 178C, 189G, 198G, 201G, 213G*, 216T, 219T, 246T, 255T, 267T, 270G*, 271T, 282G, 285G, 288A*, 291A, 312A, 316C, 327G, 336T, 345T, 348A, 351G, 354C, 355C, 357A, 376C, 381A, 387C, 396A, 399A, 429C, 438G, 447A*, 456G, 465G, 468A, 469C, 480G*, 487T, 501C, 502C, 513C, 519A, 528T, 534A, 537C*, 543A*, 549A, 550C, 552G*, 558C, 564C, 567T	N/A	N/A
<i>Halgerda nuarrensensis</i> sp. nov.	<i>H. aurantiomaculata</i>	60C, 138C, 180G*, 384A, 390T, 465A, 477T, 567C	289A, 427A	N/A (compared to <i>H. meringuecitrea</i> : none)
<i>Halgerda indotessellata</i> sp. nov.	<i>H. tessellata</i>	91T*, 99C, 101G*, 102C*, 168, 171G*, 183C*, 189A, 195T, 198A, 219C, 231A, 237T, 261A, 271T, 282G, 291G, 315C, 321T, 324G, 372A, 375T, 390C, 399T, 432T, 44G, 453C, 456A, 487T, 489G, 495G, 507T, 546G, 547T, 559A, 564T, 582C, 585C, 592A*, 594T*	N/A	N/A (compared to <i>H. meringuecitrea</i> : 16A, 37G, 46G, 51A, 58A, 91G, 100T, 103G, 115G, 141G, 156G, 157C, 169G, 184C, 193A, 205G, 211G, 235A, 244G, 262A, 301G, 304G, 316)
Species	Compared to	Nucleotides diagnostics COI	Nucleotides diagnostics 16S	Nucleotides diagnostics H3
Halgerda	<i>Halgerda</i>	91A, 99T, 101C, 102G, 139T, 171A, 175T,	N/A	N/A

mozambiquensis sp. nov.	<i>indotessellata</i> sp. nov.	177G, 183T, 192G*, 207C, 240A, 256C, 264C, 291A, 312A, 321T, 324A, 328A, 329G, 354C, 360T, 336C*, 375C, 384A, 390T, 411T, 444A, 450A, 453T, 447G*, 492C, 519T, 525C*, 531C, 546A, 563C, 579C, 592G, 594G		(compared to <i>H. meringuecitrea</i> : 100T, 156G, 235A)
<i>Halgerda jennyae</i> sp. nov.	<i>H. meringuecitrea</i> sp. nov.	168G, 178C, 259C, 267A, 270T, 312A, 348T, 384A, 394C, 411T, 438A, 440C, 469T, 513T, 564T	N/A	64A, 64G, 88G, 156G
<i>H. meringuecitrea</i> sp. nov.	<i>H. mozambiquensis</i> sp. nov.	6T, 28T, 36A, 42A, 54A, 69T, 75C, 123T, 129A, 156C, 177A, 192A, 201A, 219T, 232T, 234A, 240T, 252C, 255C, 256T, 264T, 270C, 288C, 312C*, 315A, 321C, 328G, 339A, 345C, 366T, 384T, 394T, 411C, 420T, 469C, 477A, 486A, 495A, 513C, 522C*, 525T, 531A, 543T, 576A	N/A (compared to <i>H. leopardalis</i> : 120T, 124G, 142A, 144T*, 150C*, 162A, 163C*, 199A*, 203G, 204G, 207T*, 242T, 251C*, 255C*, 293C, 315G, 345G, 392A*, 397T*, 399A*, 431T, 453T, 456A)	N/A (compared to <i>H. nuarrensensis</i> : none)
<i>Halgerda leopardalis</i> sp. nov.	<i>H. dalanghita</i>	126C*, 129G, 135A, 138A, 150T*, 153T, 159G, 175T, 178T, 189A, 198A, 201G, 213A, 216C*, 219C, 246A*, 255C, 267A, 270T, 271C, 282A, 285A, 288T, 291G, 312T, 316T, 327A, 336C*, 345A*, 348G, 351A, 354T, 355T, 357G, 376T, 381G*, 387T, 396T, 399T, 429T, 438A, 447T, 456A, 465A, 468G, 469T, 480A, 487C, 501T, 502T, 513T, 519T, 528C*, 534G*, 537A, 543C, 549G*, 550T, 552A, 558T, 564T, 567C	N/A (<i>H. meringuecitrea</i> : 39T, 120C, 124T, 142G, 144A, 150T, 162T, 163T, 199G, 203A, 204gap, 207C, 242C, 251T, 255T, 293T, 315A*, 345A*, 392G, 397A, 399T, 431gap, 453A, 456C)	N/A

*diagnostic characters that are different from all others congener

Table S3. Comparison between *H. cf. formosa* MHN-YT1288 and *H. formosa* MHN-YT1682

<i>Halgerda cf. formosa</i> (MHN-YT1288)	<i>Halgerda formosa</i> (MHN-YT1682)
	
<ul style="list-style-type: none"> • Size: 8mm • 4 branchial leaves pinnate only on top • Thin marginal white line • Scarce secondary lines between ridges • Minute marginal tubercles, only visible under stereomicroscope • Tubercle between ridges absent • Radula (lost) • Reproductive system immature 	<ul style="list-style-type: none"> • Size: 13mm • 4 branchial leaves slightly more pinnate than MHN-YT1288 • Thin marginal white line • Abundant secondary lines between ridges • Small, but clearly visible, marginal tubercles surround the mantle • Ridges sometimes forming low tubercles • Radula (= <i>H. formosa</i>) • Reproductive system mature
<p>Nucleotides (alignment 599pb) Position 195 - C Position 240 - C Position 384 - A Position 399 - T Position 415 - C Position 469 - T Position 546 - G</p>	<p>Nucleotides (alignment 599pb) Position 195 - T Position 240 - T Position 384 - G Position 399 - A Position 415 - T Position 469 - C Position 546</p>