Another marine radiation in the Cape Verde Islands

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OUTLINE

01 Model system: Cape Verde Islands

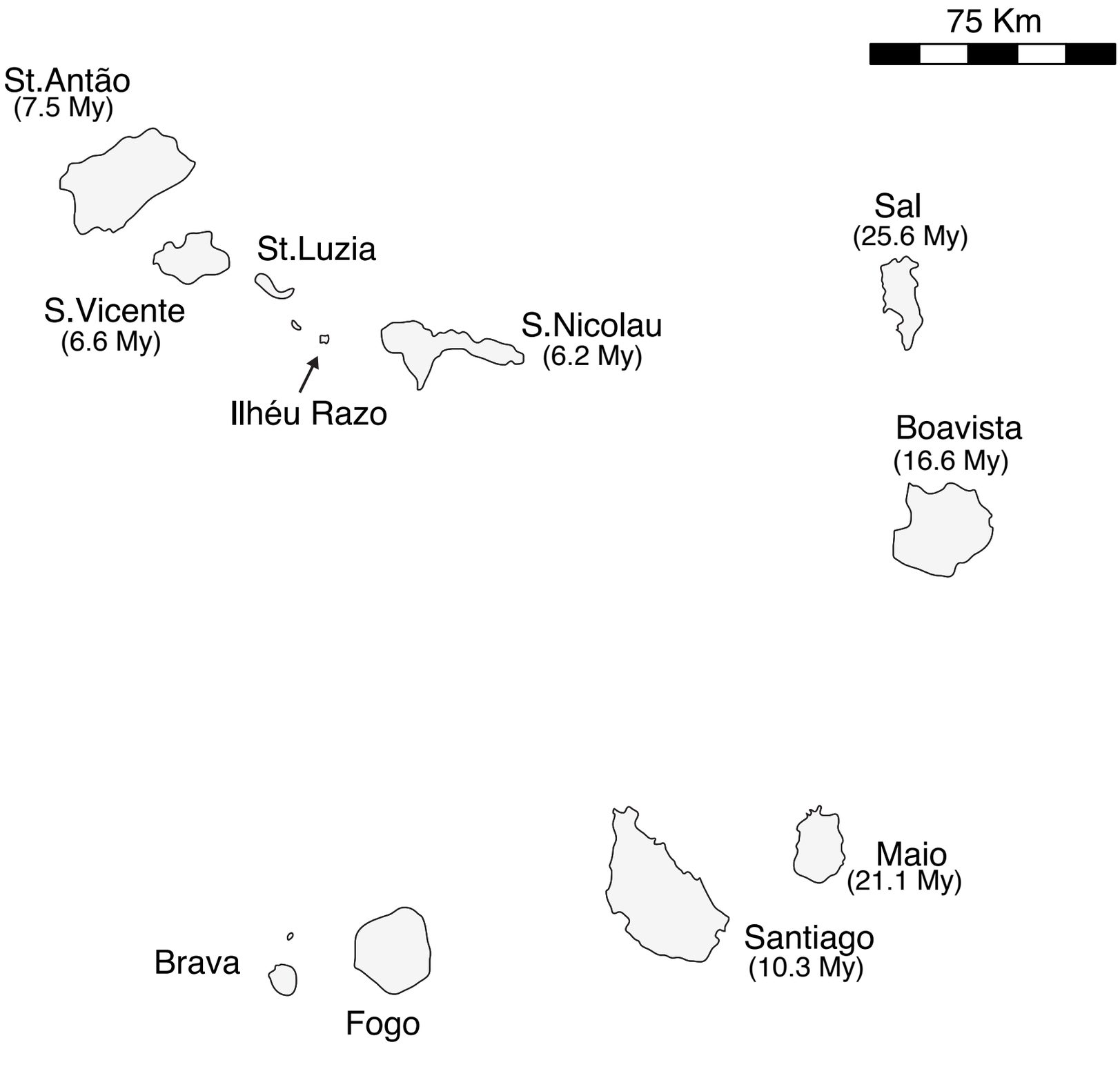
02 Keyhole limpets

01

Model system: Cape Verde Islands

01

Model system: Cape Verde Islands



02

Fissurella

7 endemic out of 12

Diodora

1 endemic out of 6

02

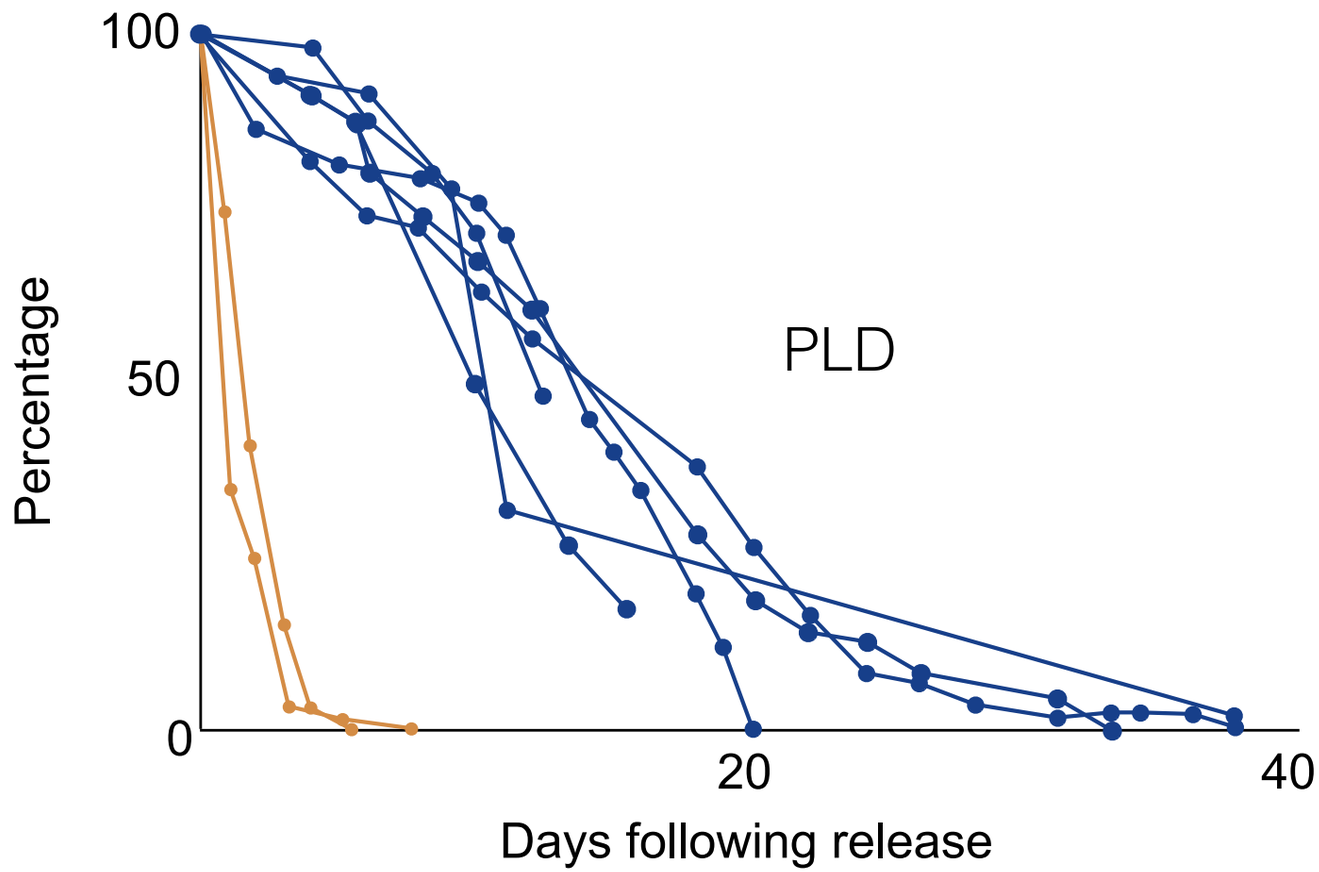
Breeding

♀♂

OCTOBER

NOVEMBER

Broadcast spawners

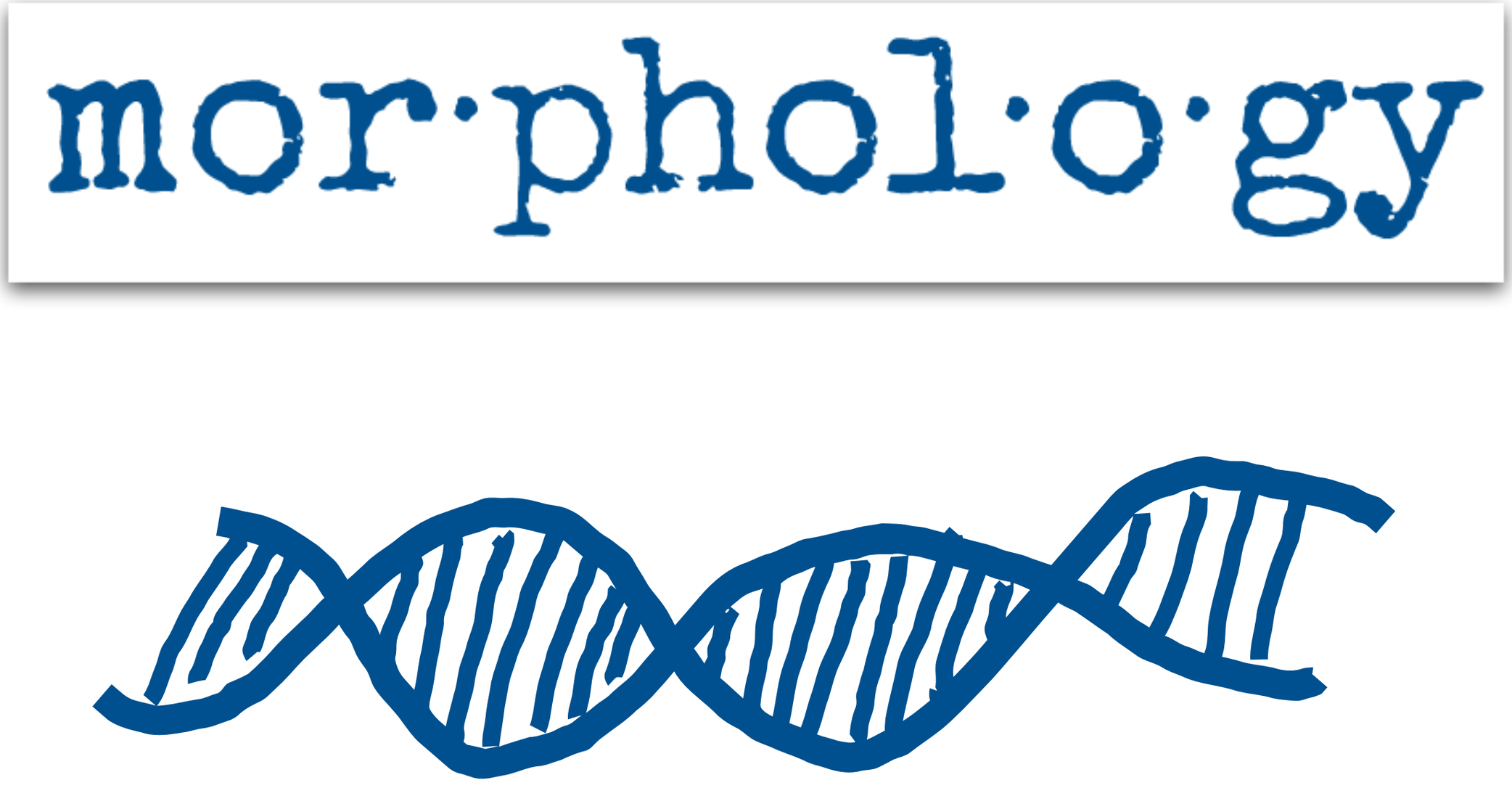


Levin 1984

PLD:
4 days (*Fissurella*)
between no larval phase or 3 weeks (*Diodora*)

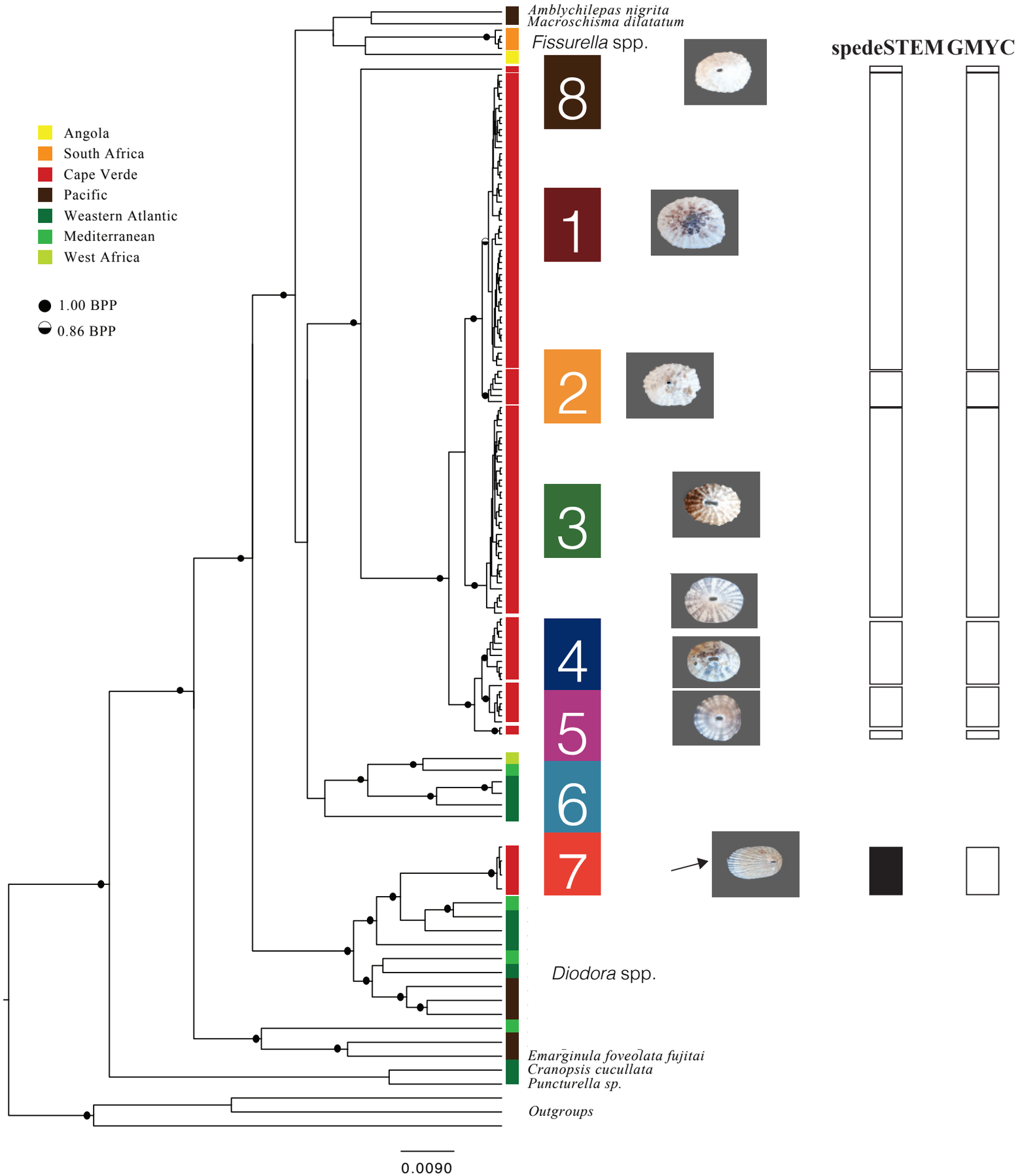
02

Conflicting results



02

BI tree
COI+28S rRNA



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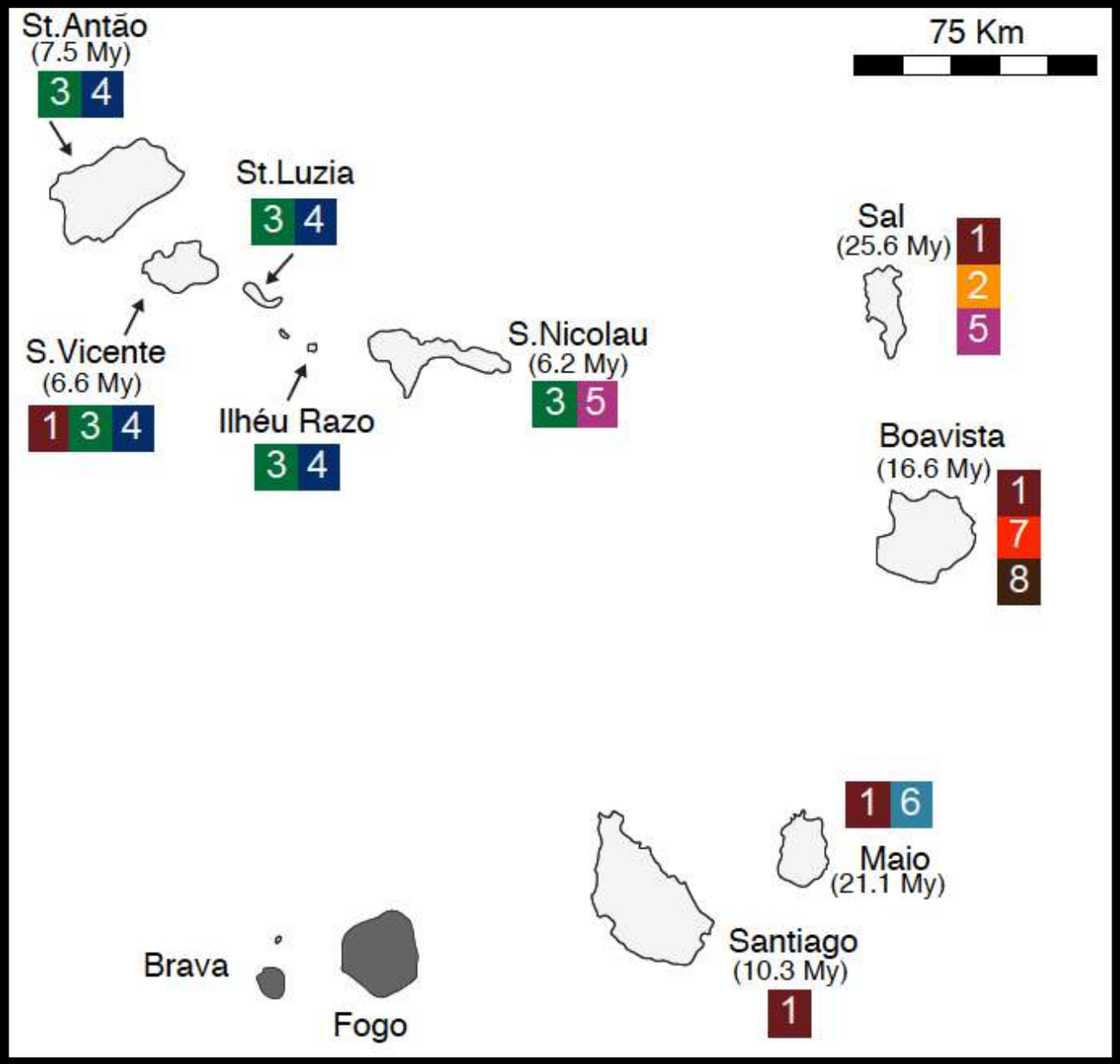
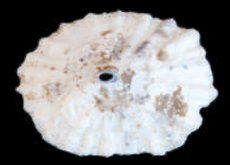


1 *Fissurella bravensis*

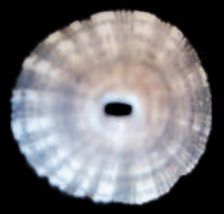


2 *Fissurella* sp. 1

3 *Fissurella* afra

4 *Fissurella verna*

5 *Fissurella* sp. 2



6 *Fissurella gaillardi*

7 *Fissurella* cf. *salvatiana*

8 *Diodora philippiana*

02

1

7

2

1

6

Fissurella

3

Diodora

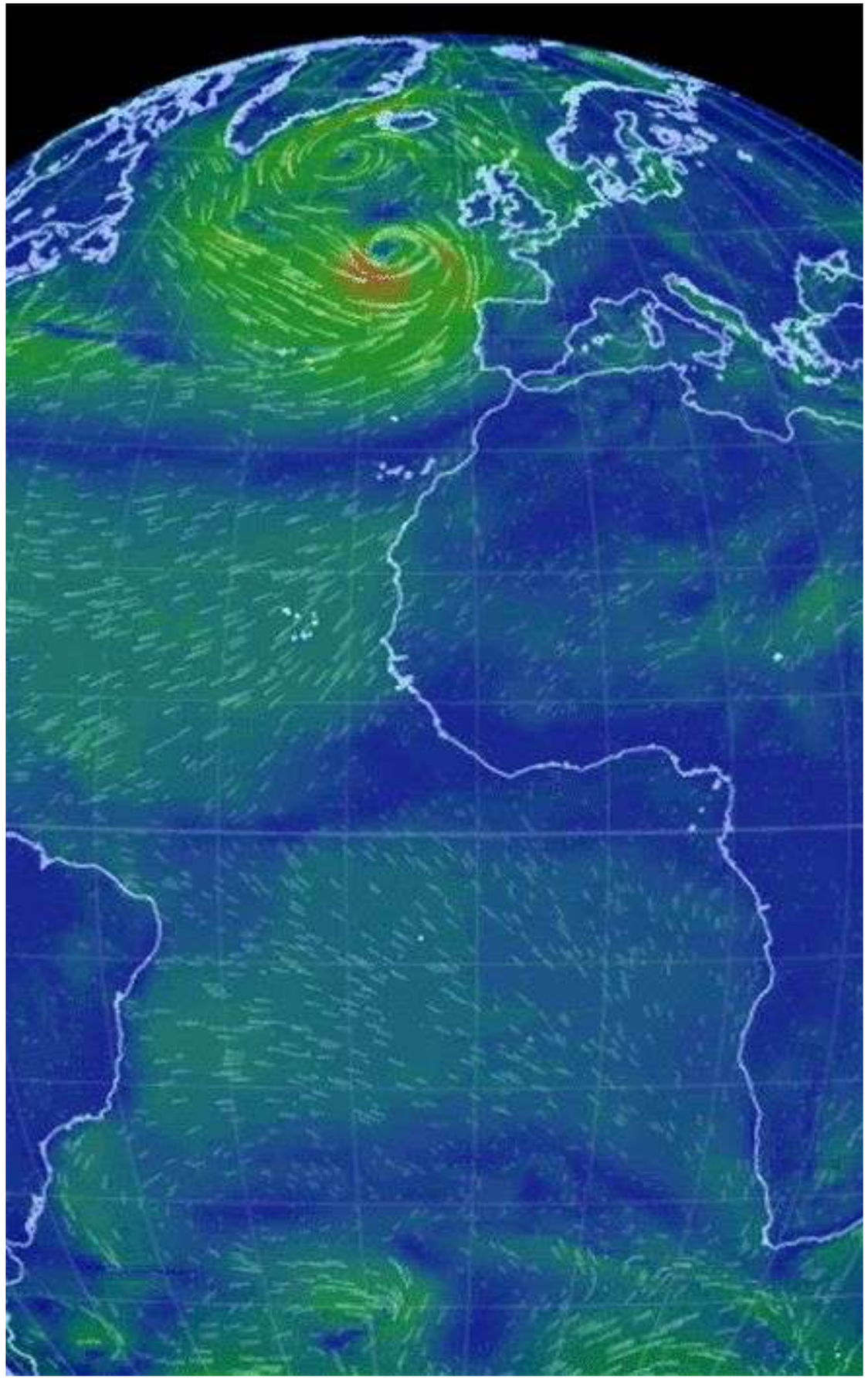
5

4

02

Cape Verde *Fissurella* and *Diodora* release gametes in the water column

Dispersal is mostly determined by ocean currents



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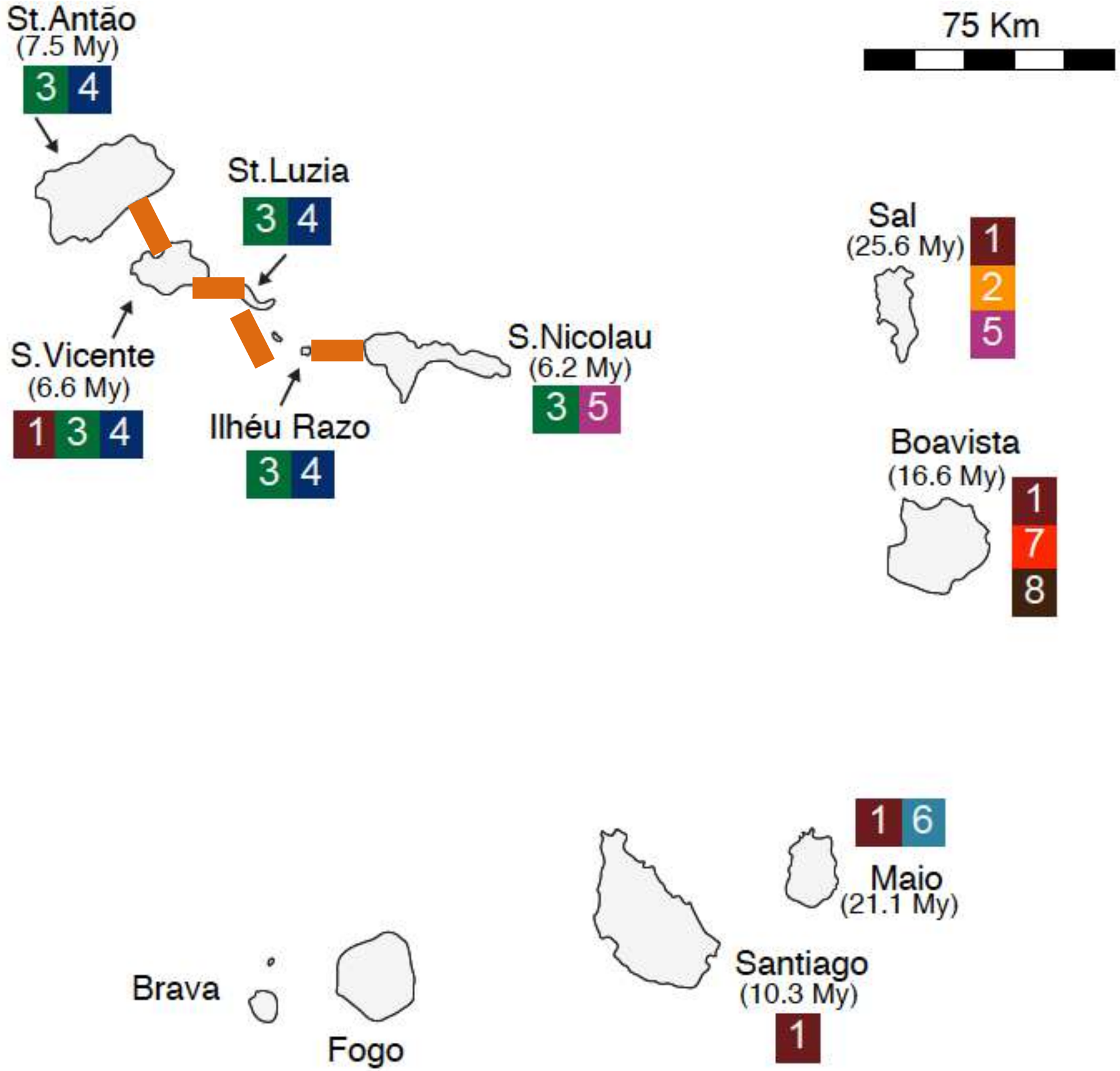
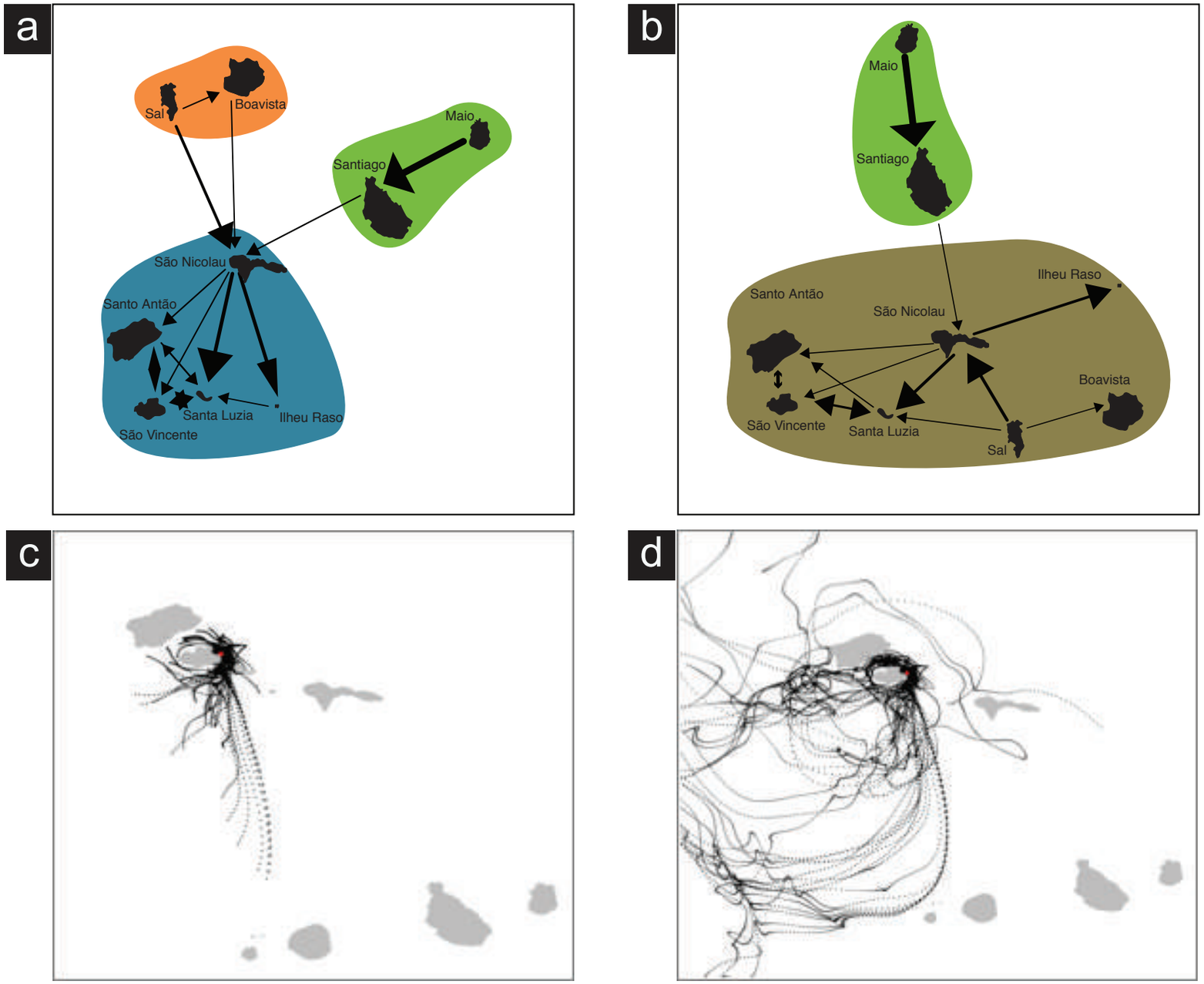

St.Antão
(7.5 My)
3 4
St.Luzia
3 4
S.Vicente
(6.6 My)
1 3 4
Ilhéu Razo
3 4
S.Nicolau
(6.2 My)
3 5
75 Km
Sal
(25.6 My)
1
2
5
Boavista
(16.6 My)
1
7
8
1 6
Maio
(21.1 My)
Santiago
(10.3 My)
1
Brava
Fogo

02 Simulations of passive dispersal using ocean currents

4 days: 75 km

30 days: 76 km



Oceanic circulation

02

1

7

2

1

6

Fissurella

3

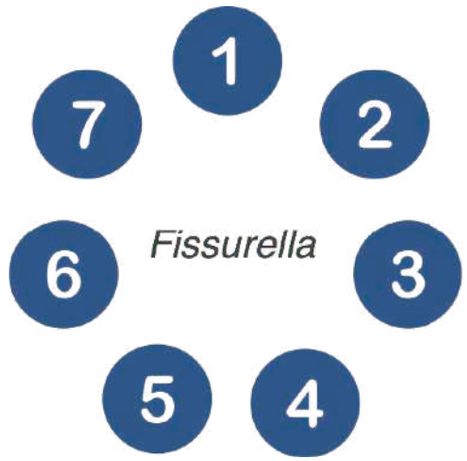
Diodora

5

4

02

HYPOTHESIS

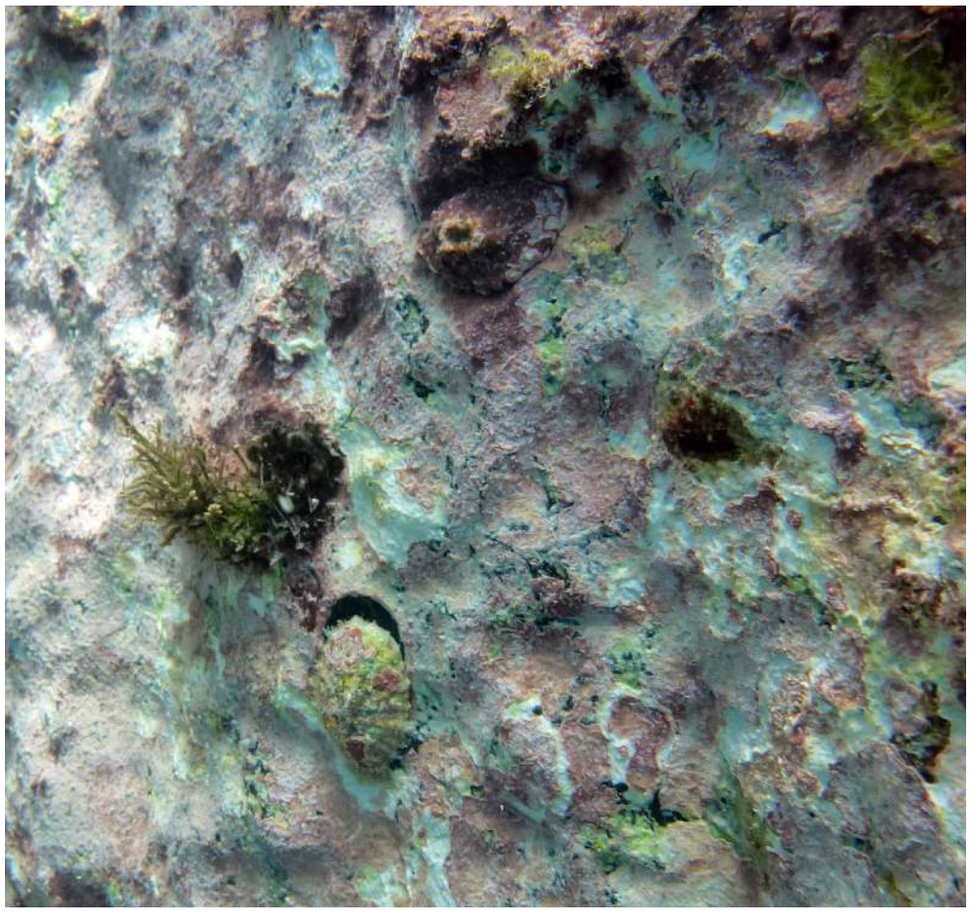


1

Diodora

A - Habitat specialization and niche partitioning

02 Habitat specialization and niche partitioning



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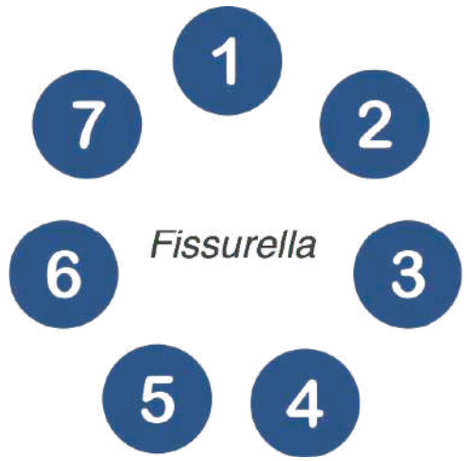
HYPOTHESIS

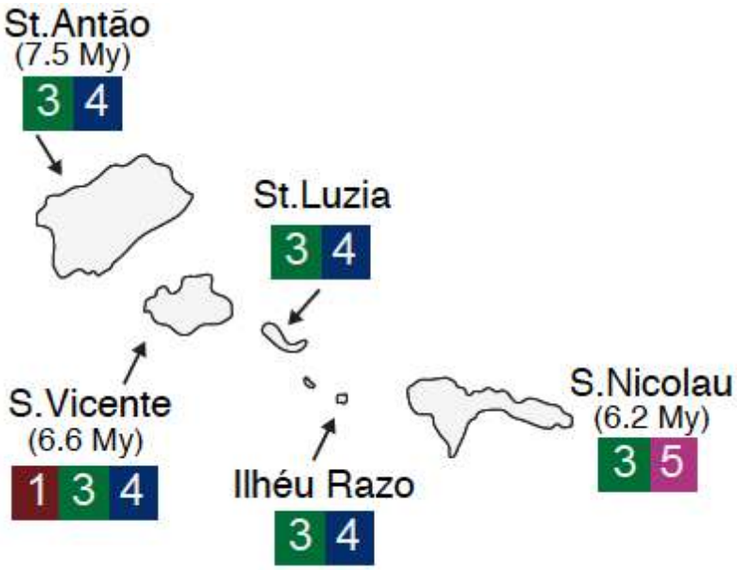


A - Habitat specialization and niche partitioning

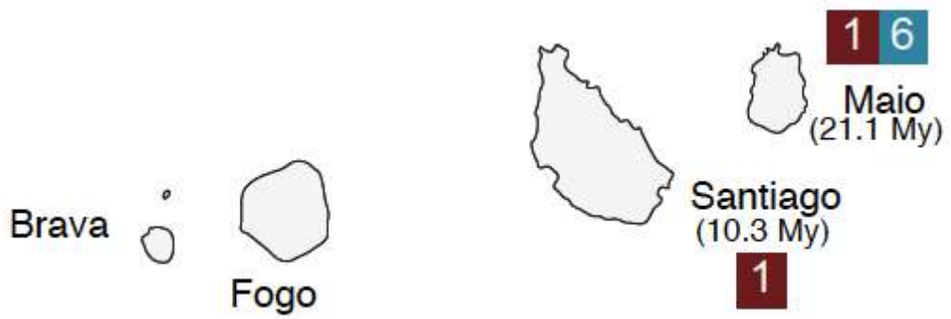
B - Undersampling in *Diodora*

02 Undersampling in *Diodora philippiana*

Fissurella spp.
363 specimens
found in 9 islands



Diodora philippiana
only 26 specimens in
total found
on a single island



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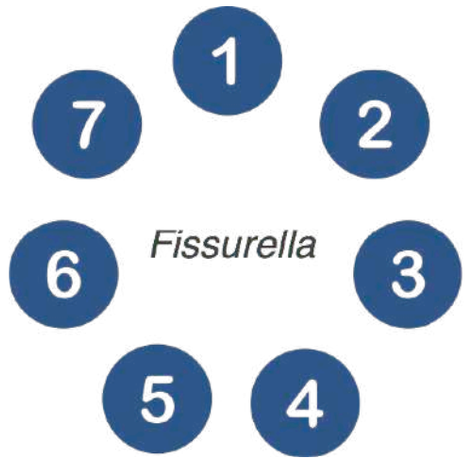
HYPOTHESIS

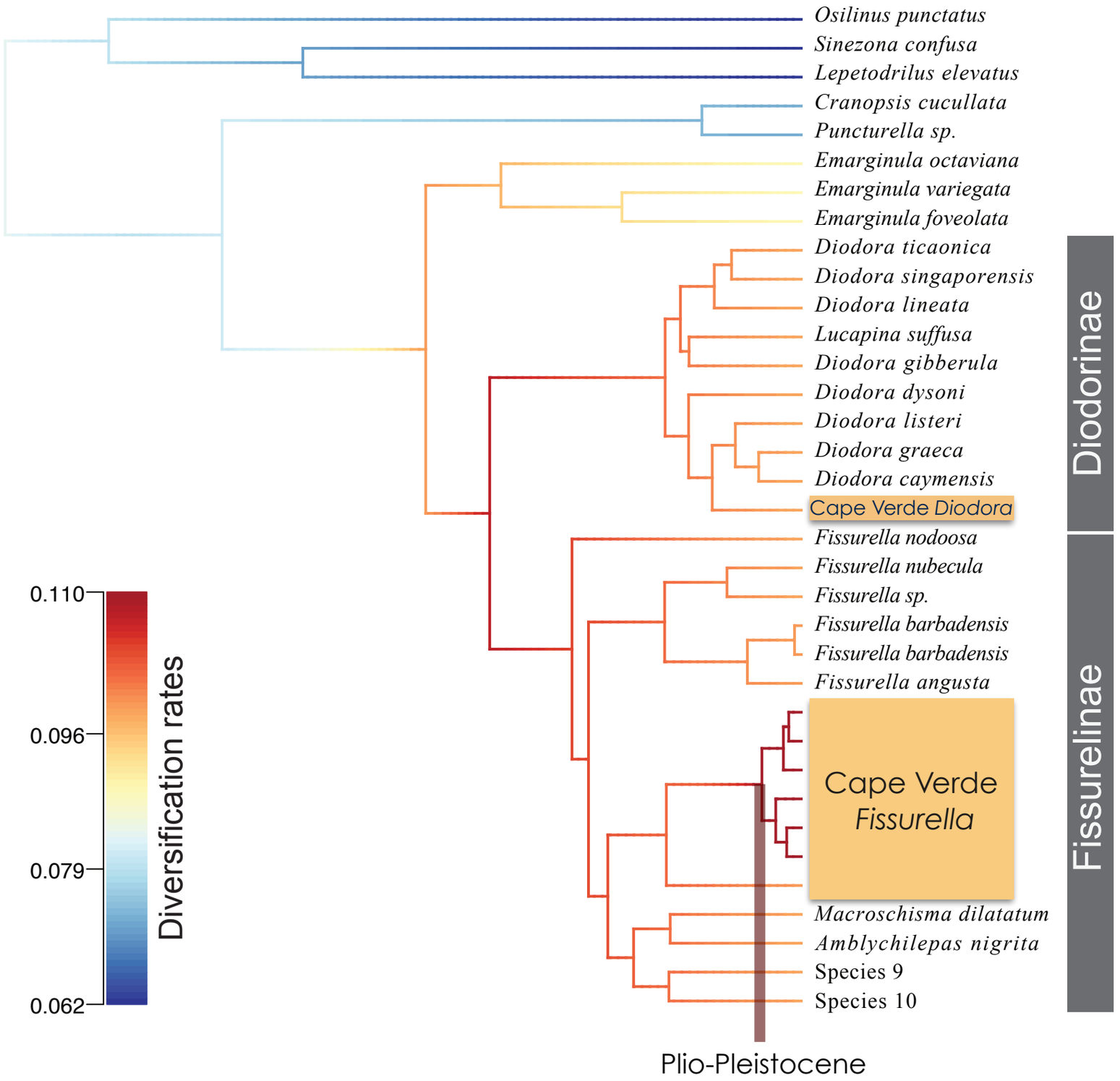


A - Habitat specialization and niche partitioning

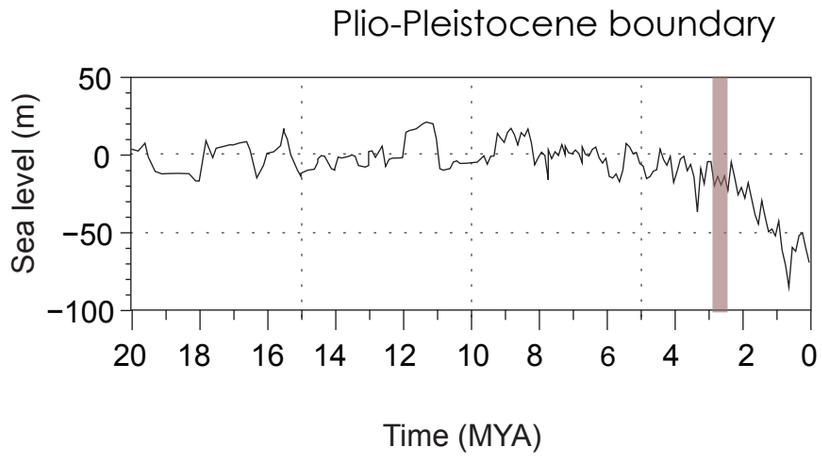
B - Undersampling in *Diodora*

C - increased diversification rates in *Fissurella*

02 Increased diversification rates in *Fissurella*



BAMM Bayesian Analysis of Macroevolutionary Mixtures



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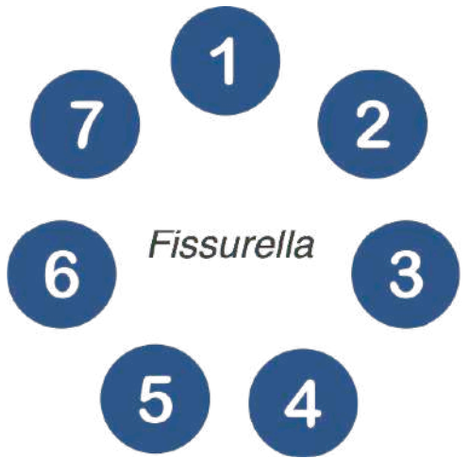
HYPOTHESIS



A - Habitat specialization and niche partitioning

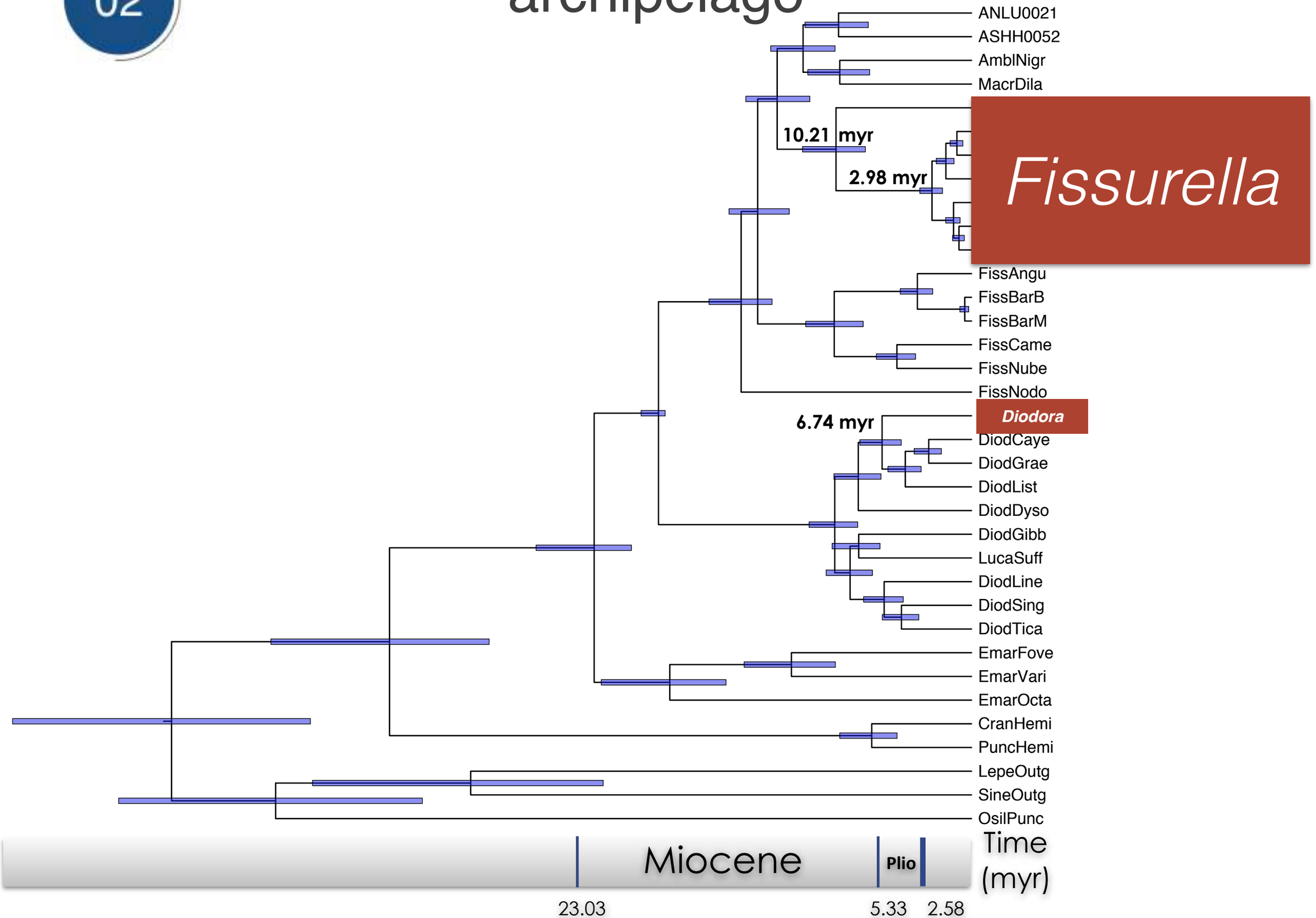
B - Undersampling in *Diodora*

C - increased diversification rates in *Fissurella*

D - Time of origin of each genus in the archipelago

02

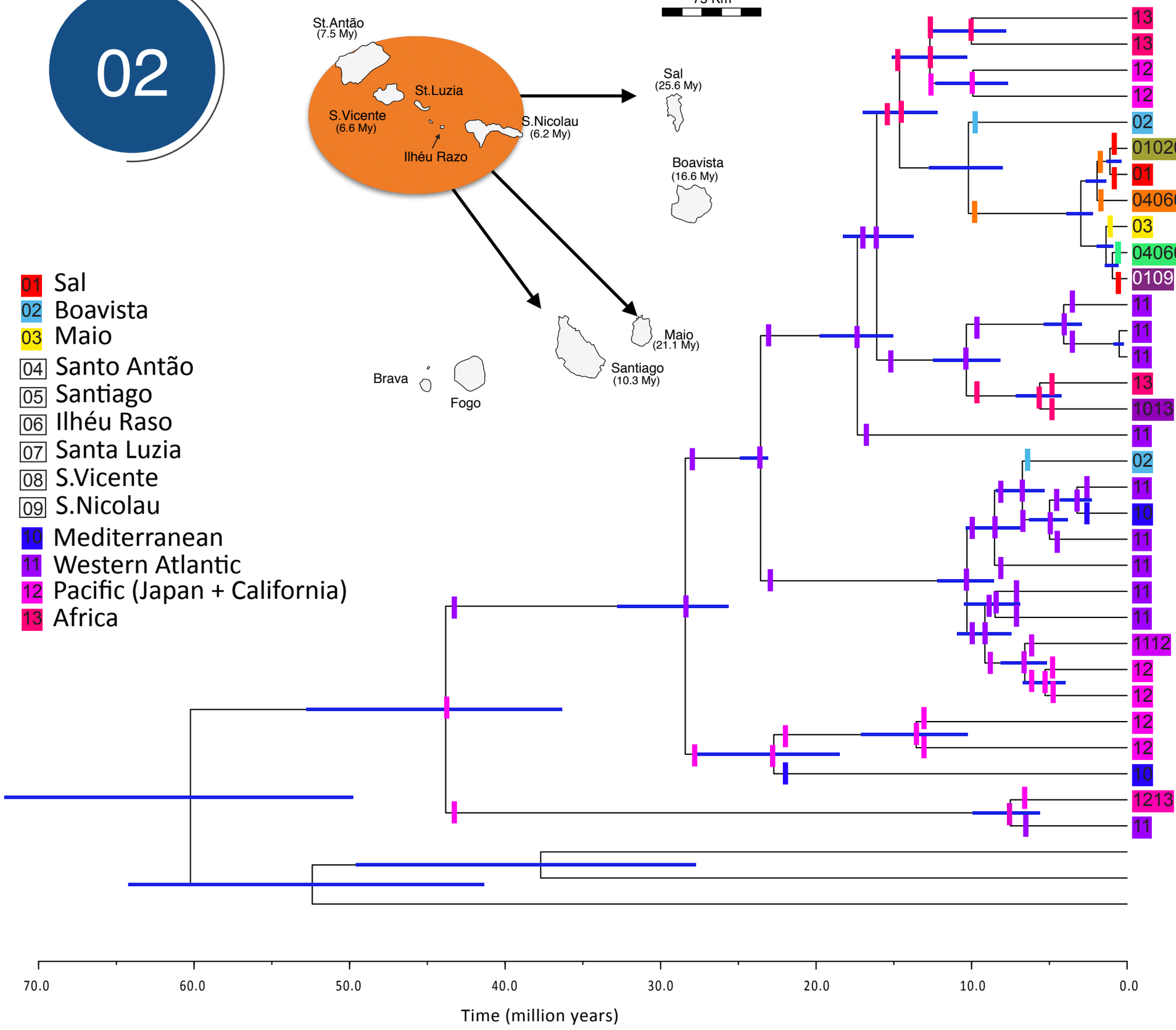
Time of origin of each genus in the archipelago



Ancestral range estimation - BioGeoBears

02

01 Sal
02 Boavista
03 Maio
04 Santo Antão
05 Santiago
06 Ilhéu Raso
07 Santa Luzia
08 S.Vicente
09 S.Nicolau
10 Mediterranean
11 Western Atlantic
12 Pacific (Japan + California)
13 Africa



Fissurellidae sp. 1
Fissurellidae sp. 2
Amblychilepas nigrita
Macroschisma dilatatum
Fissurella cf. *salvatiana*
Fissurella bravensis
Fissurella sp. 1
Fissurella afra
Fissurella gaillardi
Fissurella verna
Fissurella sp. 2
Fissurella angusta
Fissurella barbadensis
Fissurella barbadensis
Fissurella sp. 2
Fissurella nubecula
Fissurella nodoosa
Diodora philippiana
Diodora cayenensis
Diodora graeca
Diodora listeri
Diodora dysoni
Diodora gibberula
Lucapina suffusa
Diodora lineata
Diodora singaporensis
Diodora ticaonica
Emarginula foveolata
Emarginula variegata
Emarginula octaviana
Cranopsis cucullata
Puncturella sp.
Lepetodrilus elevatus
Sinezona confusa
Osilinus punctatus

Software - BioGeoBears

02

Fissurella (7 endemic) vs *Diodora* (1 endemic)

Species delimitation tests

02

Fissurella (7 endemic) vs *Diodora* (1 endemic)

PLD 

02

Fissurella (7 endemic) vs *Diodora* (1 endemic)

PLD

Oceanic circulation

02

Fissurella (7 endemic) vs *Diodora* (1 endemic)

PLD 

Oceanic circulation 

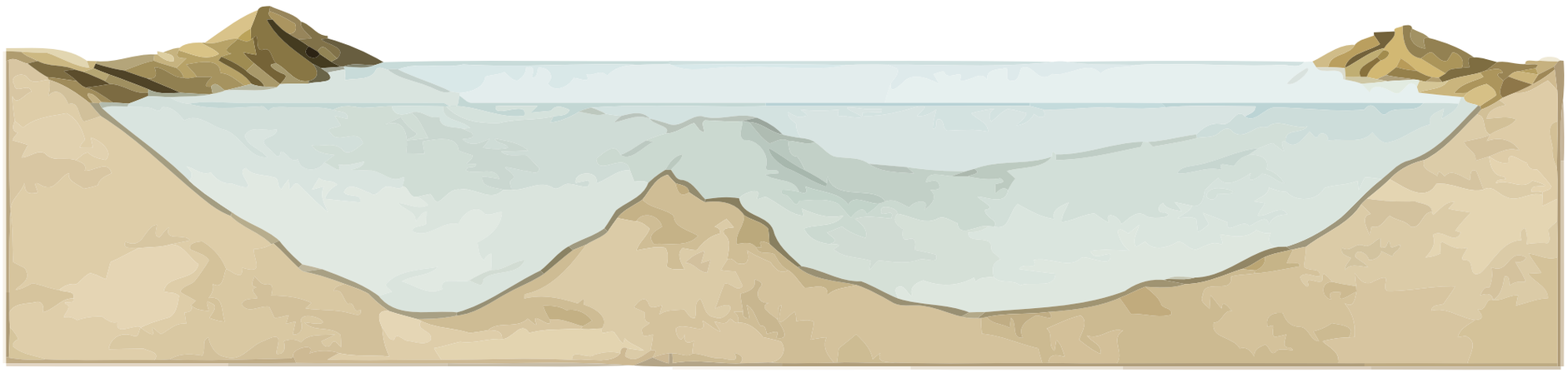
Divergence time 

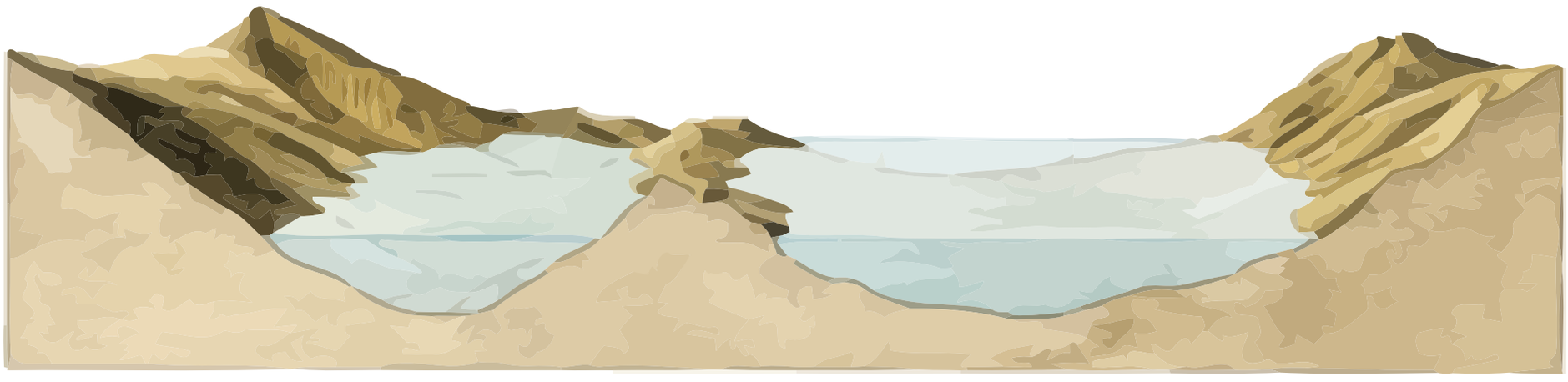
02

Fissurella (7 endemic) vs *Diodora* (1 endemic)

02

Fissurella (7 endemic) vs *Diodora* (1 endemic)





02

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SCIENTIFIC REPORTS

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Drivers of Cape Verde archipelagic endemism in keyhole limpets

Regina L. Cunha[1], Jorge M. Assis[1], Celine Madeira[1], Rui Seabra[2], Fernando P. Lima[2], Evandro P. Lopes[2,3], Suzanne T. Williams[4] & Rita Castilho[1]

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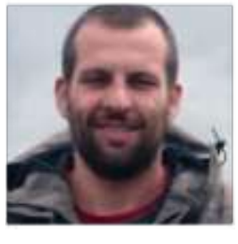

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