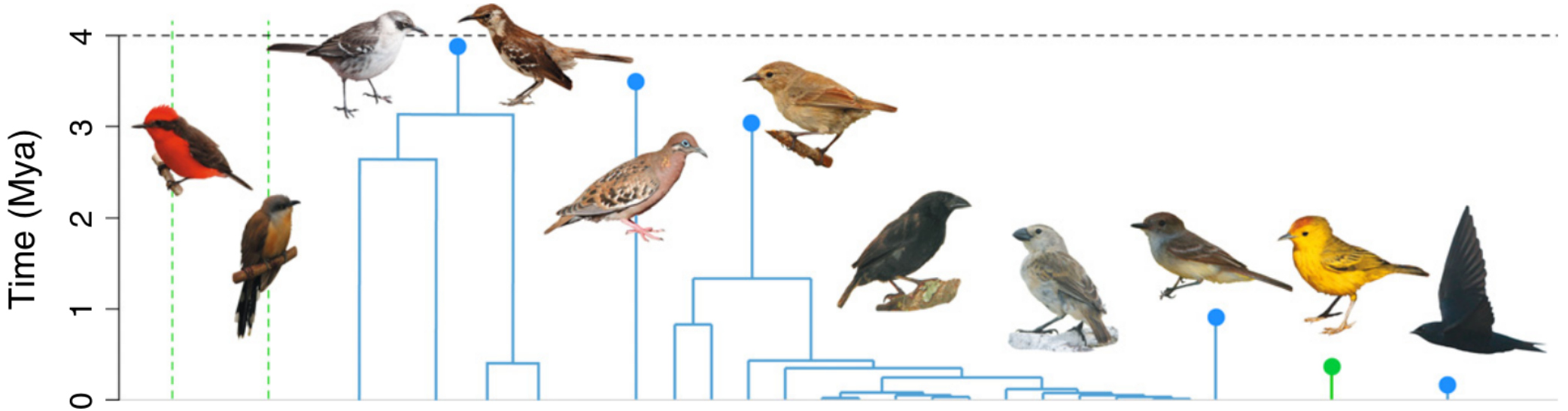


Why the Galápagos is a bad illustration of DAISIE...

Richel J.C. Bilderbeek

DAISIE

ECOLOGY LETTERS

Ecology Letters, (2015) **18**: 844–852

doi: 10.1111/ele.12461

LETTER

Equilibrium and non-equilibrium dynamics simultaneously operate in the Galápagos islands

Luis M. Valente,[1]* Albert B. Phillimore[2] and Rampal S. Etienne[3]

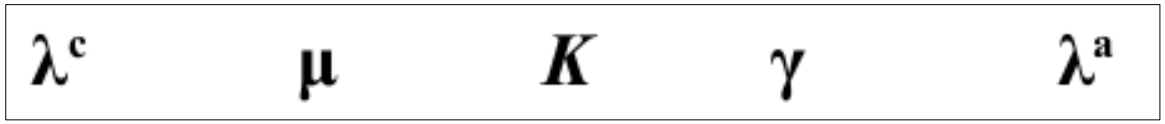
Abstract

Island biotas emerge from the interplay between colonisation, speciation and extinction and are often the scene of spectacular adaptive radiations. A common assumption is that insular diversity is at a dynamic equilibrium, but for remote islands, such as Hawaii or Galápagos, this idea

Valente et al. (2015)

DAISIE

“Here, we develop DAISIE (Dynamic Assembly of Islands through Speciation, Immigration and Extinction), a likelihood-based phylogenetic method that unifies the island biogeography framework of MacArthur & Wilson with the phylogenetic birth-death models popularised by Nee et al.”

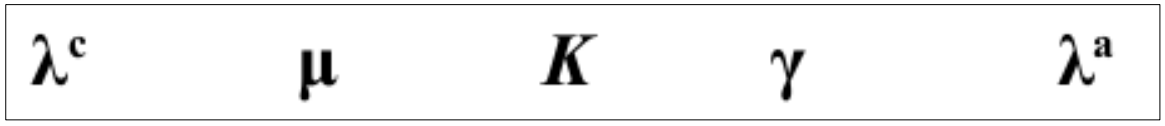


DAISIE unifies island biogeography with birth-death models

Valente et al. (2015)

DAISIE

	Description
μ	Per-species extinction rate
γ	Per-species immigration rate
λ^c	Per-species cladogenesis rate
λ^a	Per-species anagenesis rate
K	Carrying capacity

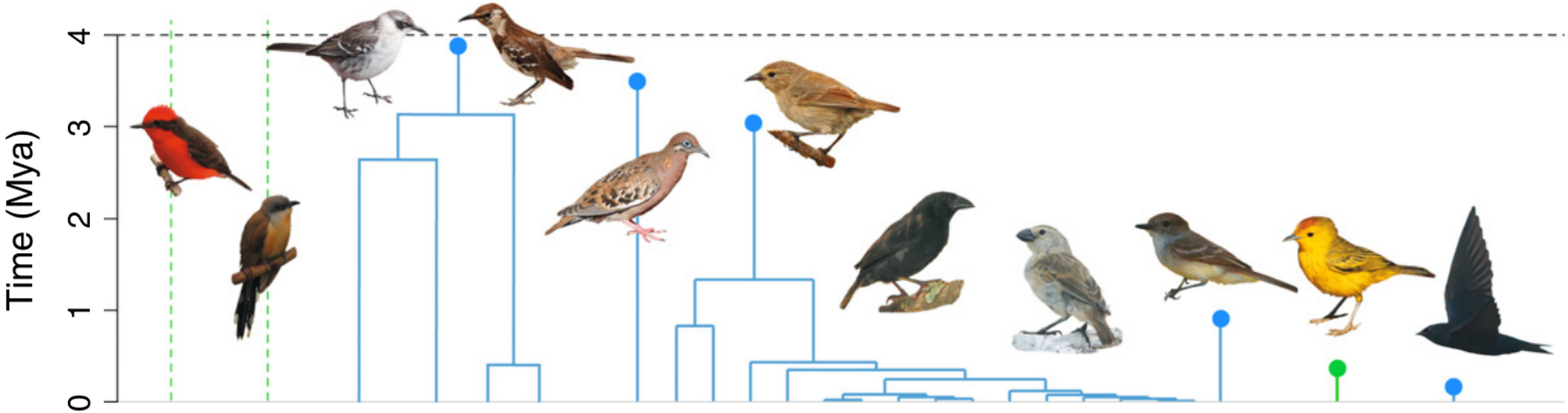


DAISIE unifies
island biogeography
with
birth-death models

Valente et al. (2015)

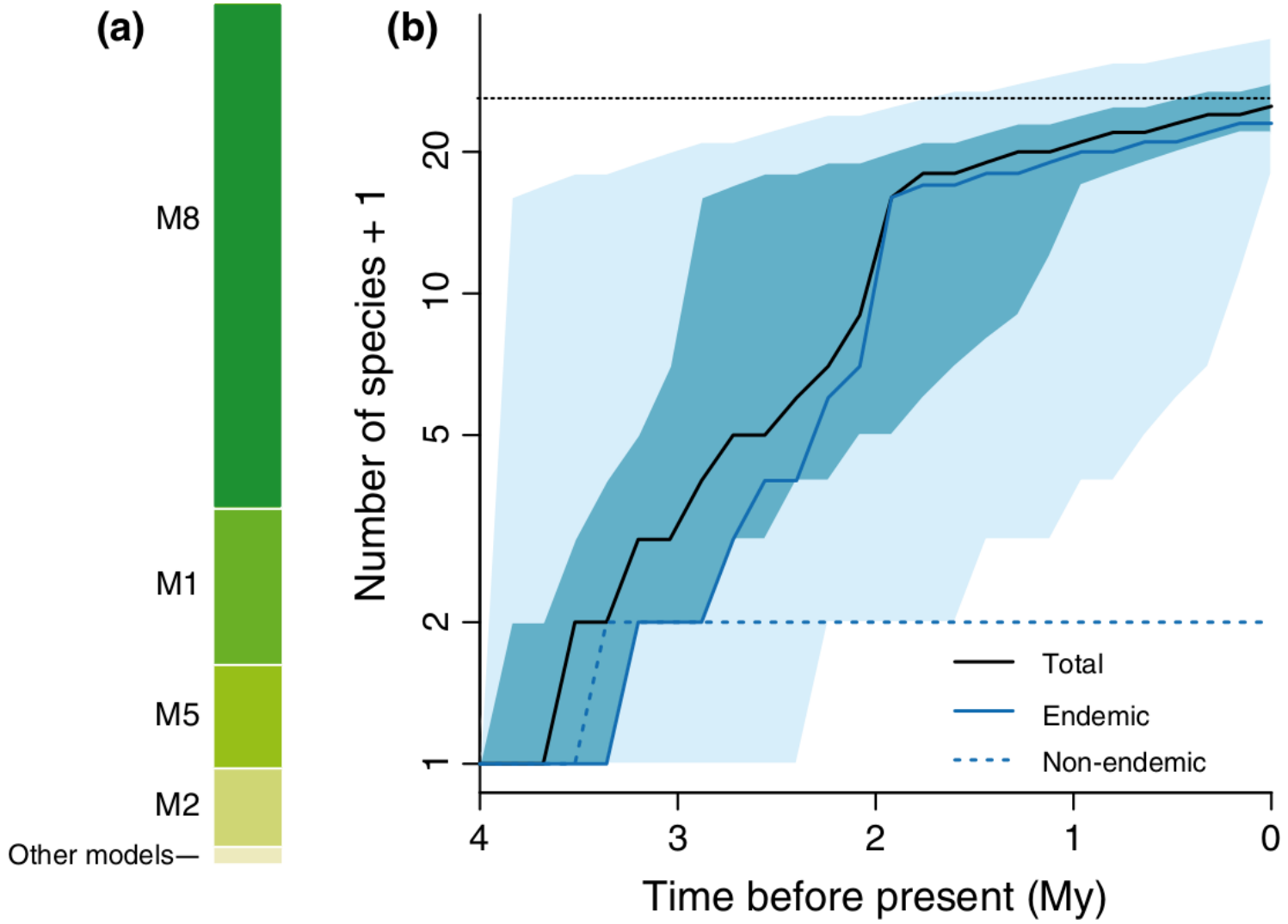
Figure 1

25 species, 8 clades



Valente et al. (2015)

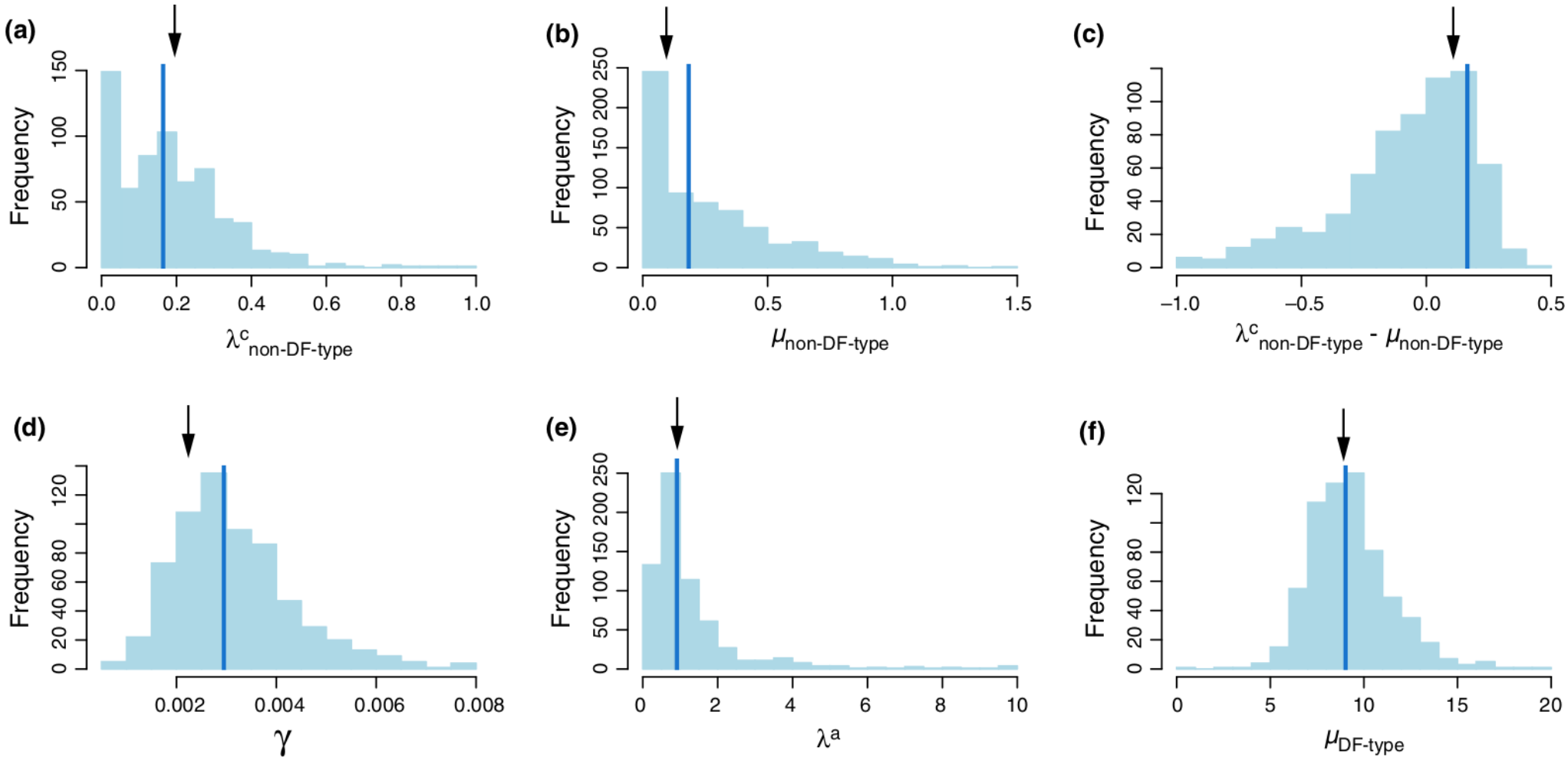
Figure 2



"According to the most strongly supported DAISIE model, the avifauna of the Galapagos islands does not tend towards a diversity steady state"

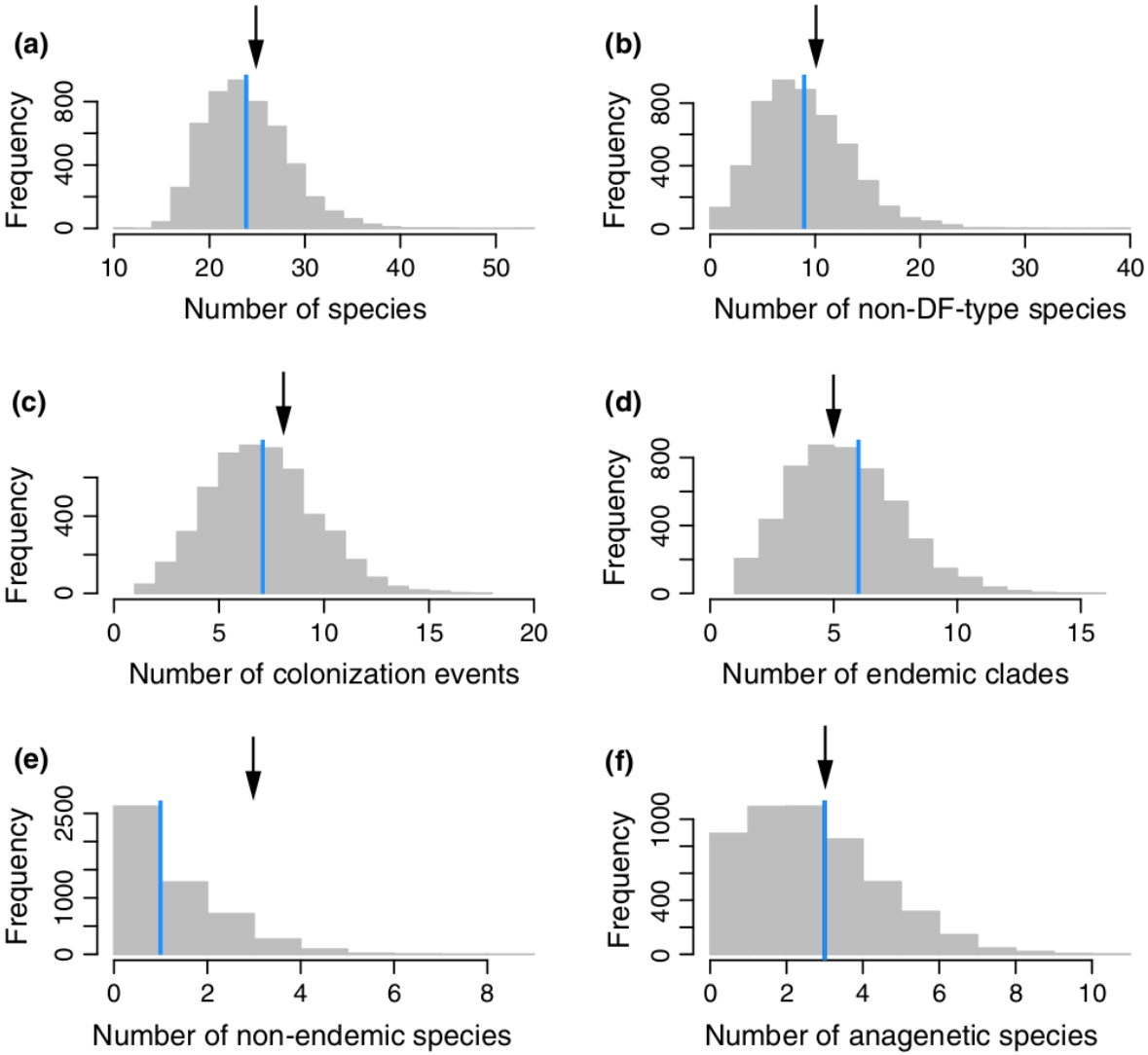
Valente et al. (2015)

Figure 3



Valente et al. (2015)

Figure 4



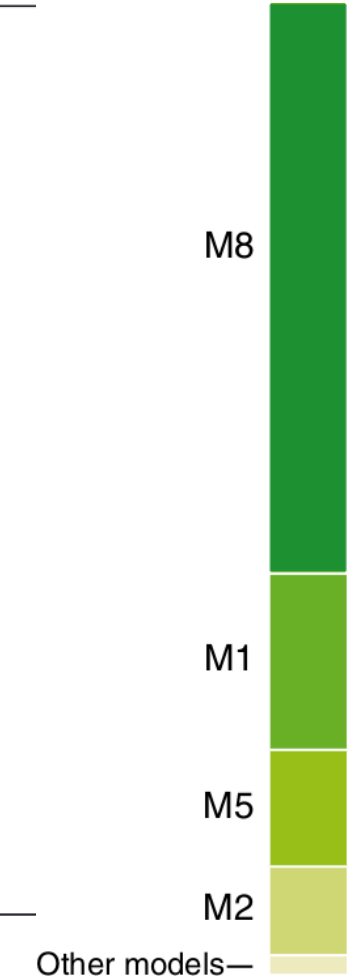
Valente et al. (2015)

My claim

The Galapagos are a bad illustration of DAISIE, because (1) the final result is weak, and (2) the figures oversell the story

The result

Name	Background					Darwin's finch type			Loglik	BIC	BIC weight
	λ^c	μ	K'	γ	λ^a	λ^c	μ	K'			
M1	2.55	2.68	-	0.009	1.01	-	-	-	-76.0	186.98	1.81×10^{-1}
M2	0.38	0.55	-	0.004	1.10	2.28	-	-	-72.3	188.36	9.14×10^{-2}
M3	2.48	2.70	-	0.009	1.02	-	2.25	-	-75.7	195.17	3.03×10^{-3}
M4	2.55	2.68	-	0.009	1.01	-	-	∞	-76.0	195.73	2.29×10^{-3}
M5	0.29	0.38	-	0.004	1.03	6.87	6.51	-	-67.7	187.81	1.20×10^{-1}
M6	0.38	0.55	-	0.004	1.10	2.28	-	∞	-72.3	197.10	1.15×10^{-3}
M7	2.48	2.70	-	0.009	1.02	-	2.25	∞	-75.7	203.92	3.83×10^{-5}
M8	0.20	0.09	-	0.002	0.87	$\gg \mu K'$	8.91	14.99	-61.7	184.64	5.86×10^{-1}
M1'	2.56	2.69	∞	0.009	1.01	-	-	-	-76.0	195.73	2.29×10^{-3}
M2'	0.42	0.52	23.7	0.004	1.10	2.27	-	-	-72.3	197.09	1.16×10^{-3}
M3'	2.65	0.46	3.7	0.003	1.32	-	2.07	-	-73.4	199.29	3.87×10^{-4}
M4'	1.84	0.49	4.0	0.003	1.25	-		∞	-74.5	201.52	1.26×10^{-4}
M5'	0.33	0.36	17.3	0.004	1.02	6.85	6.48		-67.7	196.53	1.53×10^{-3}
M6'	0.42	0.52	23.7	0.004	1.10	2.27		∞	-72.3	205.83	1.47×10^{-5}
M7'	2.65	0.46	3.7	0.003	1.32		2.07	∞	-73.4	208.03	4.88×10^{-6}
M8'	0.33	0.05	5.4	0.002	0.90	$\gg \mu K'$	8.91	14.99	-61.6	193.18	8.20×10^{-3}



Valente et al. (2015)

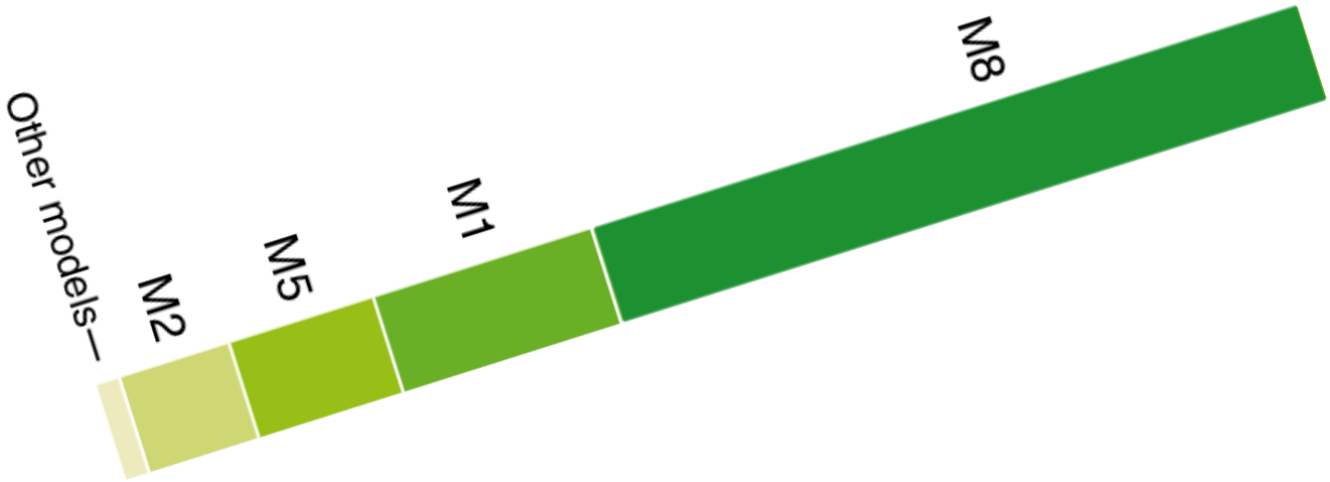
The results without DF

Name	Background					BIC weight
	λ^c	μ	K'	γ	λ^a	
M1	2.55	2.68	-	0.009	1.01	1.81×10^{-1}
M1'	2.56	2.69	∞	0.009	1.01	2.29×10^{-3}

Valente et al. (2015)

Top results

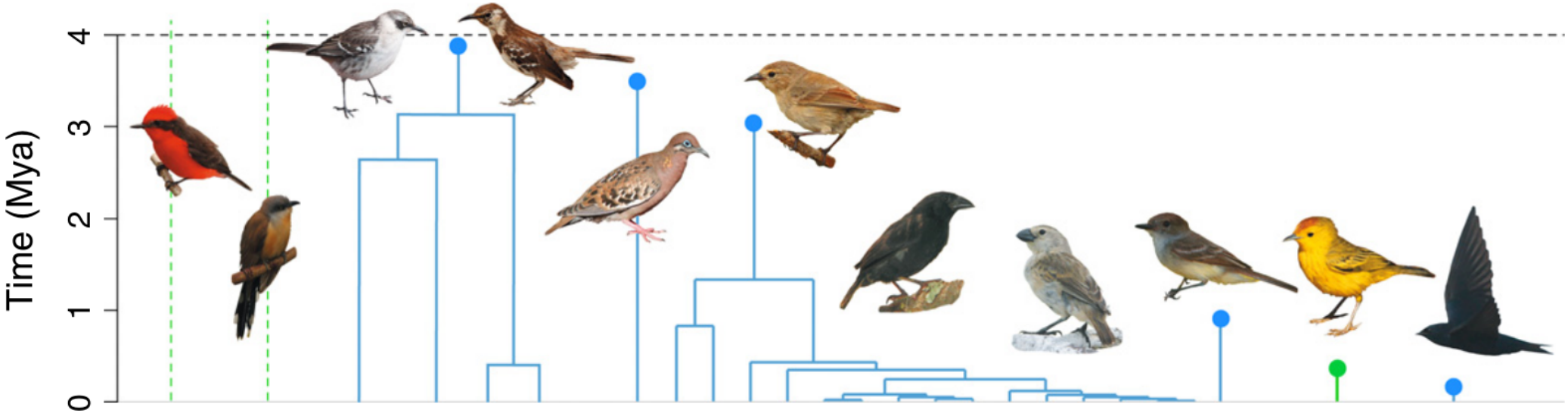
Name	Background					Darwin's finch type			BIC weight
	λ^c	μ	K'	γ	λ^a	λ^c	μ	K'	
M8	0.20	0.09	-	0.002	0.87	$\gg \mu K'$	8.91	14.99	5.86×10^{-1}
M1	2.55	2.68	-	0.009	1.01	-	-	-	1.81×10^{-1}
M5	0.29	0.38	-	0.004	1.03	6.87	6.51	-	1.20×10^{-1}
M2	0.38	0.55	-	0.004	1.10	2.28	-	-	9.14×10^{-2}



Valente et al. (2015)

What does the result work on?

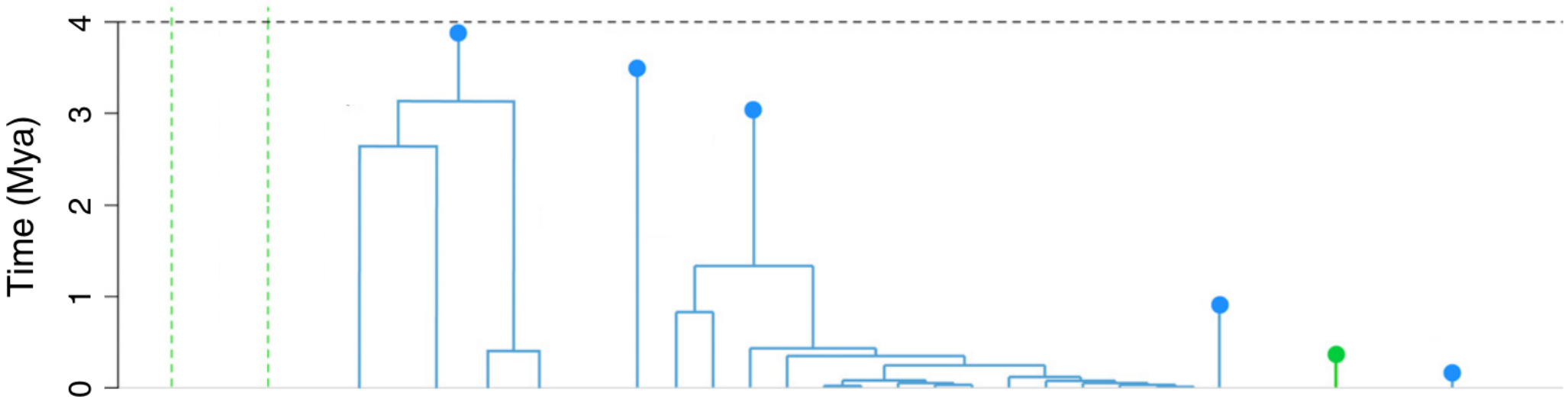
Pretty birds, 25 species, 8 clades



Valente et al. (2015)

What does the result work on?

25 species, 8 clades

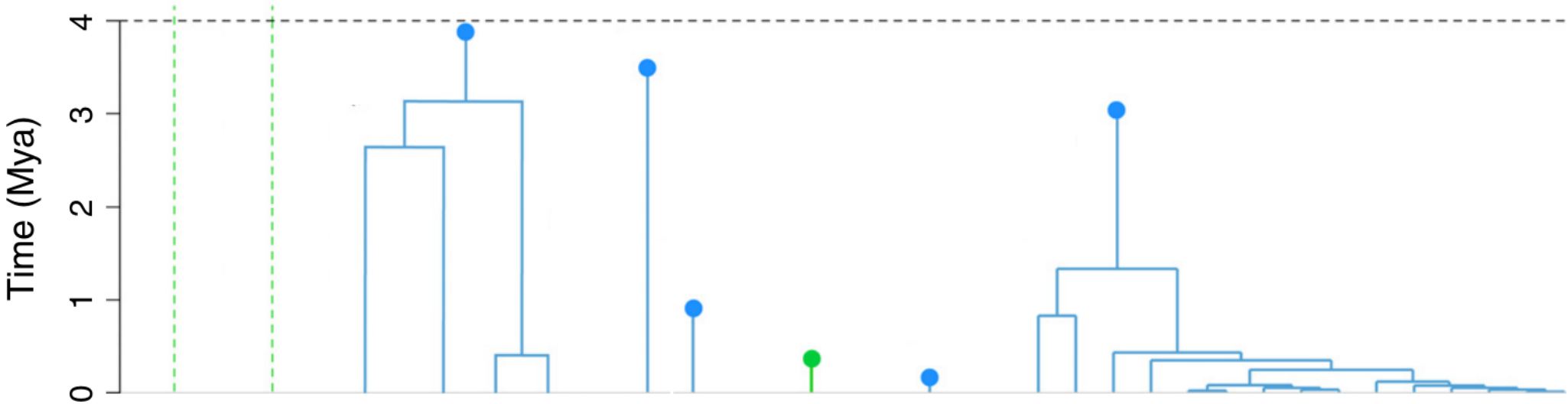


Modified from Valente et al. (2015)

What does the result work on?

7 clades with 10 species

1 clade with 15 species

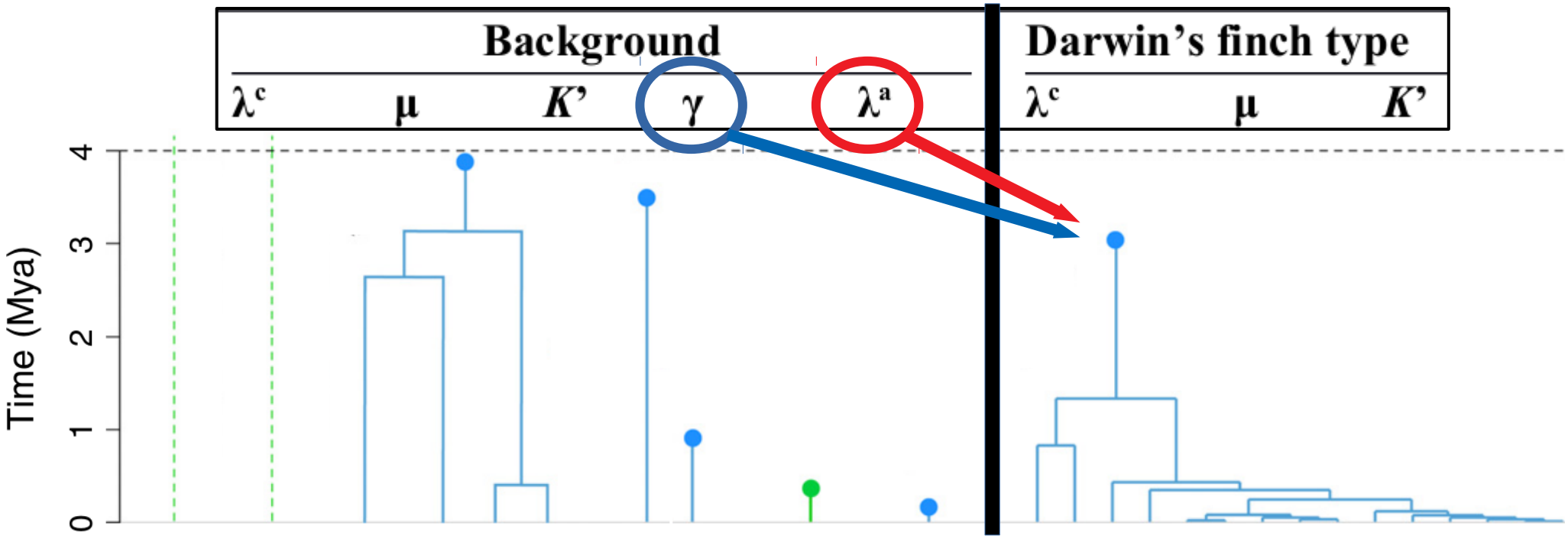


Modified from Valente et al. (2015)

What does the result work on?

7 clades with 10 species, speciation low

1 clade with 15 species, speciation rich



Modified from Valente et al. (2015)

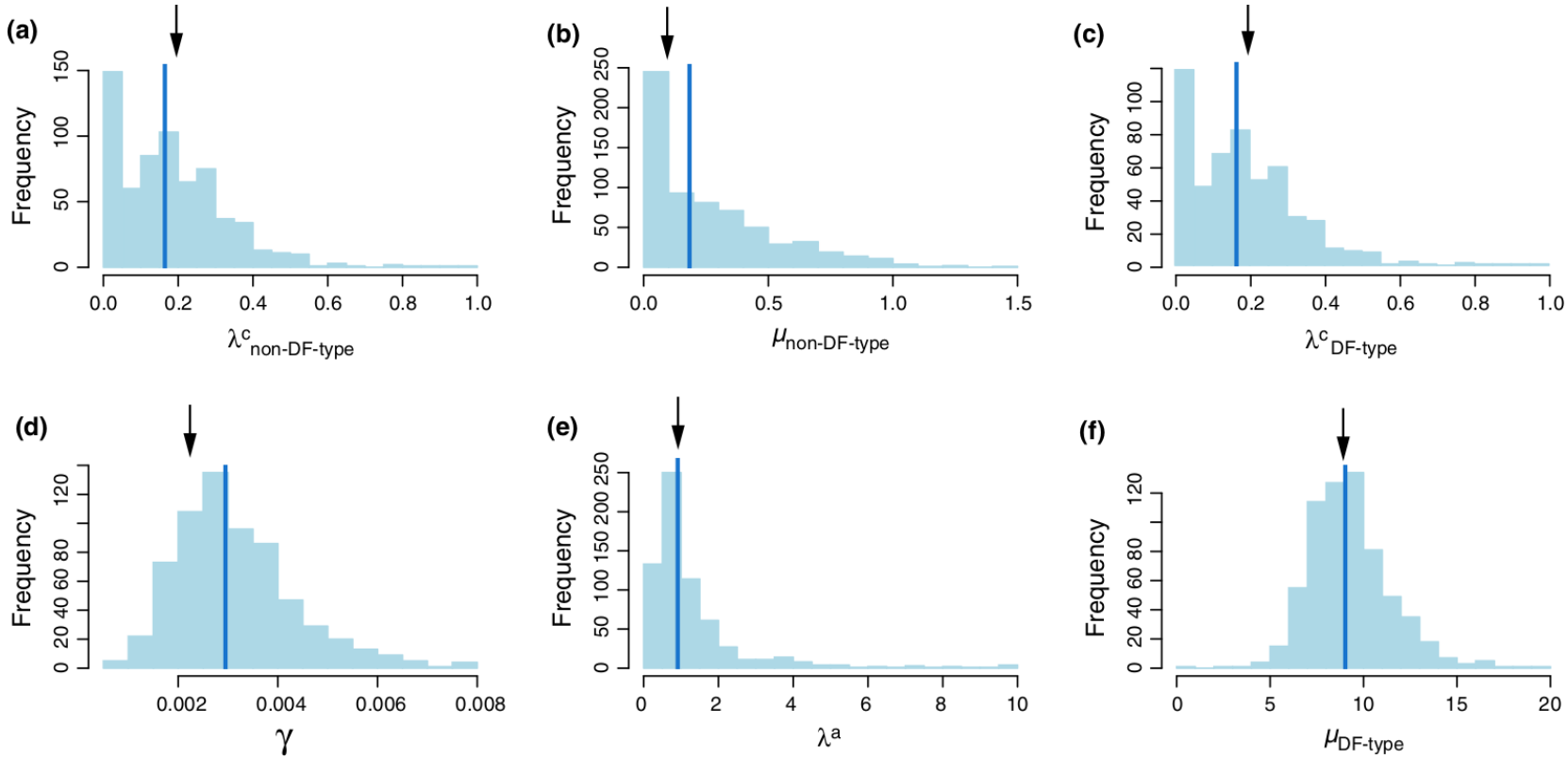
My claim

The Galapagos are a bad illustration of DAISIE, because (1) the final result is weak, and (2) the figures oversell the story

(1) there is no unification

Figures, expected

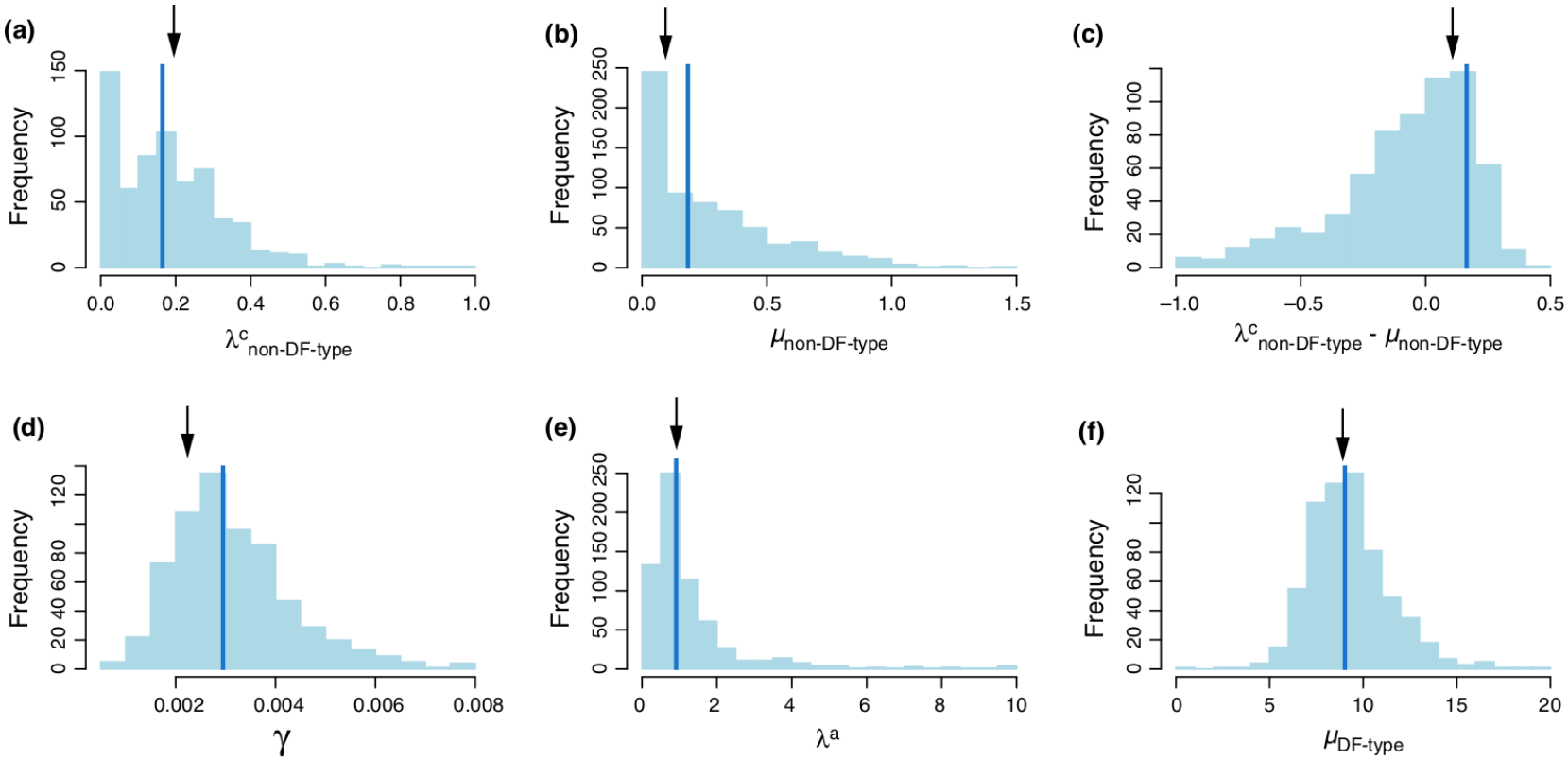
Name	Background					Darwin's finch type		
	λ^c	μ	K'	γ	λ^a	λ^c	μ	K'
M8	0.20	0.09	-	0.002	0.87	$\gg \mu K$'	8.91	14.99



Modified from Valente et al. (2015)

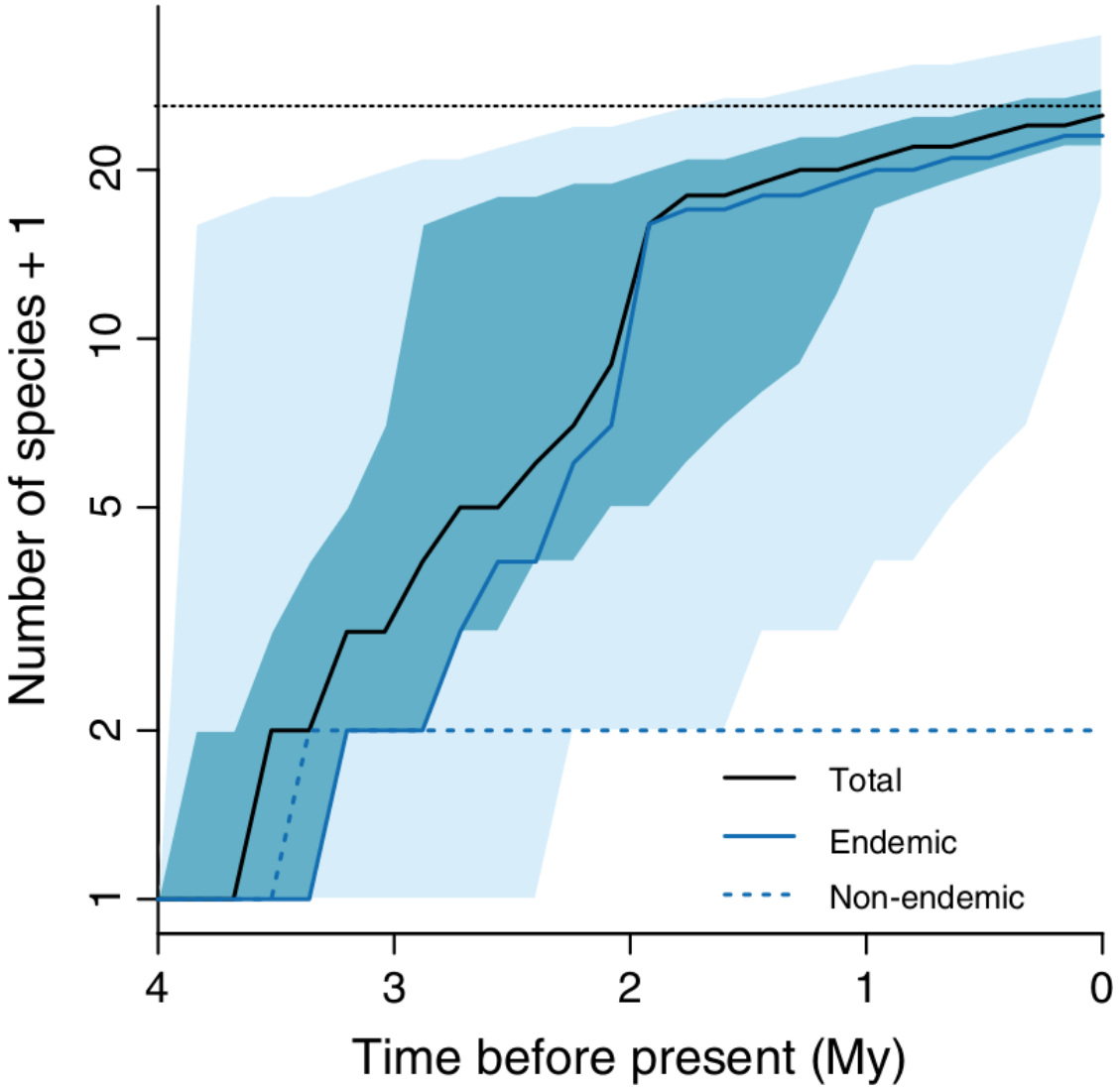
Figures

Name	Background					Darwin's finch type		
	λ^c	μ	K'	γ	λ^a	λ^c	μ	K'
M8	0.20	0.09	-	0.002	0.87	$\gg \mu K'$	8.91	14.99



Valente et al. (2015)

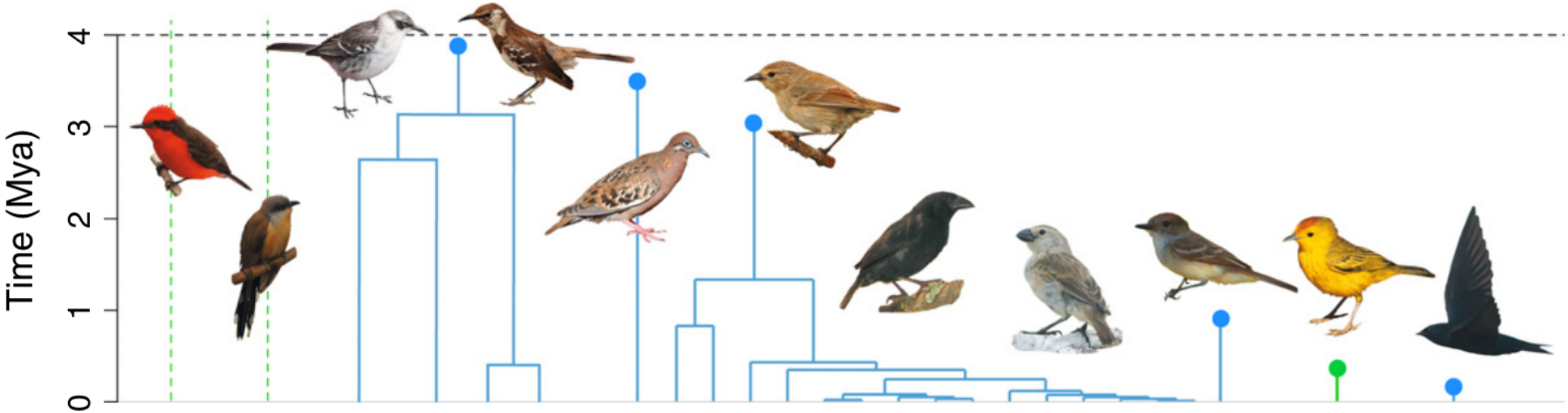
Figures



"According to the most strongly supported DAISIE model, the avifauna of the Galapagos islands does not tend towards a diversity steady state"

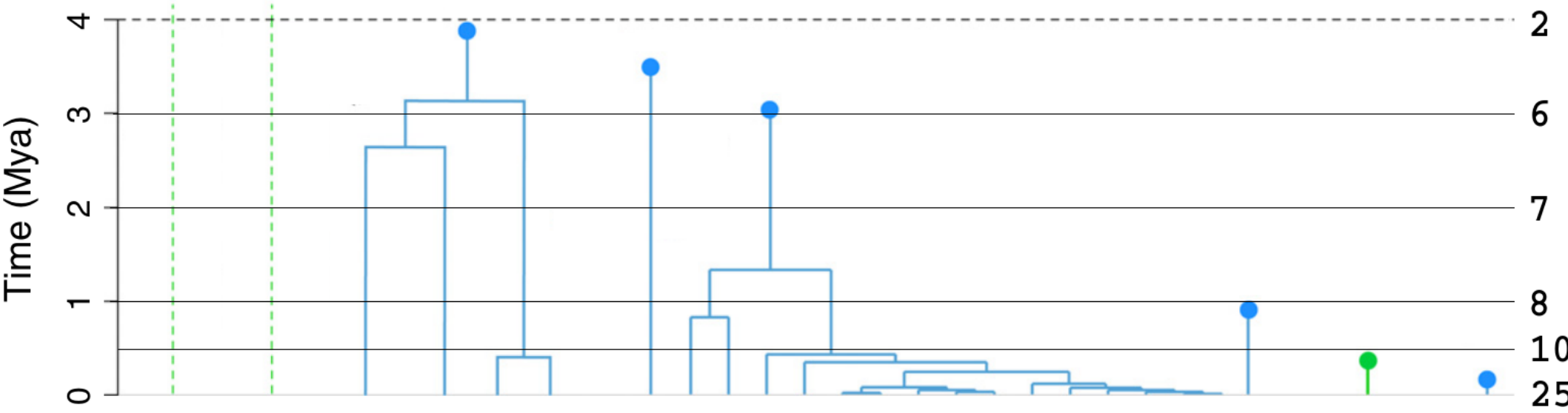
Valente et al. (2015)

Figures



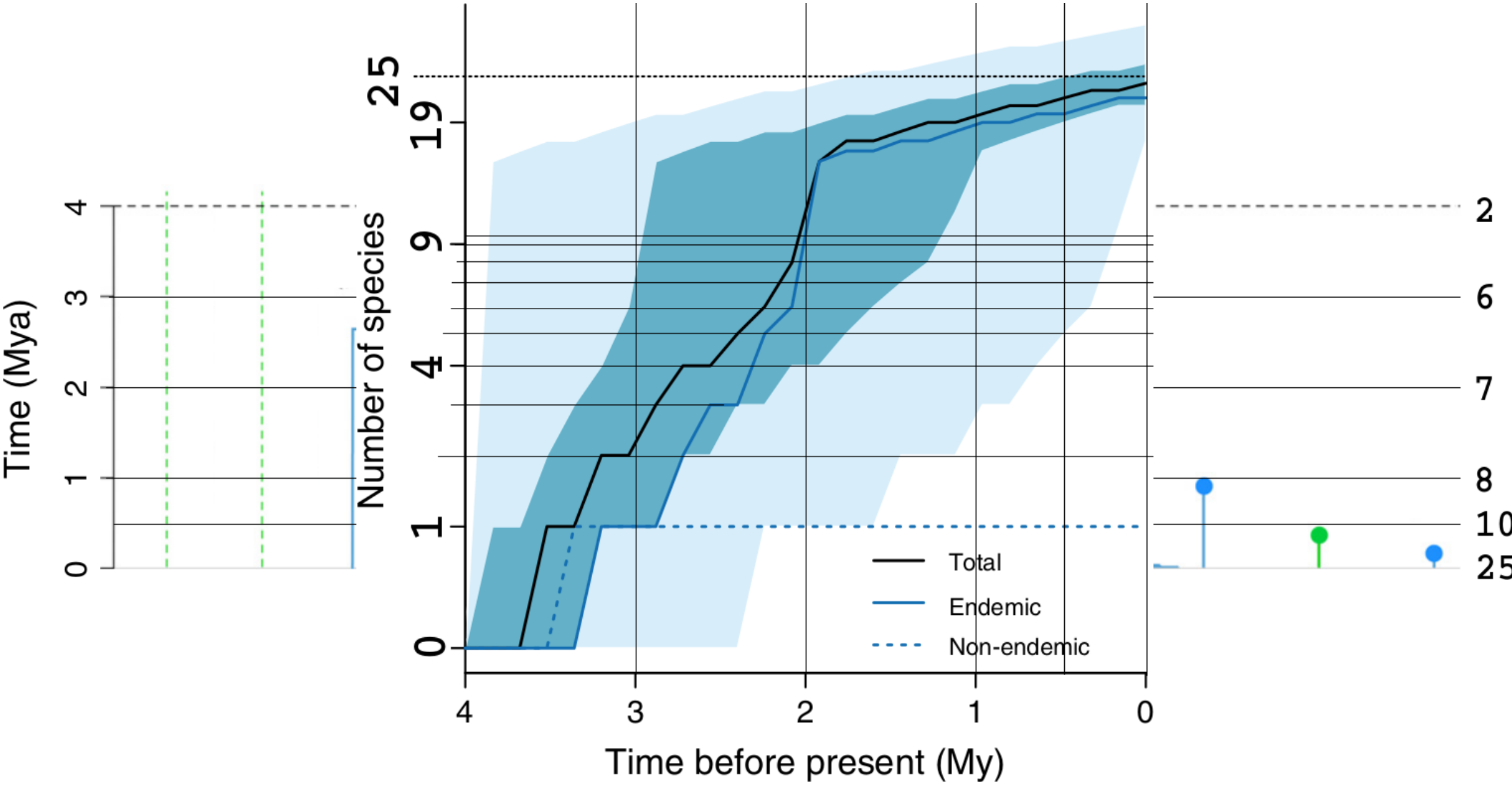
Valente et al. (2015)

Figures



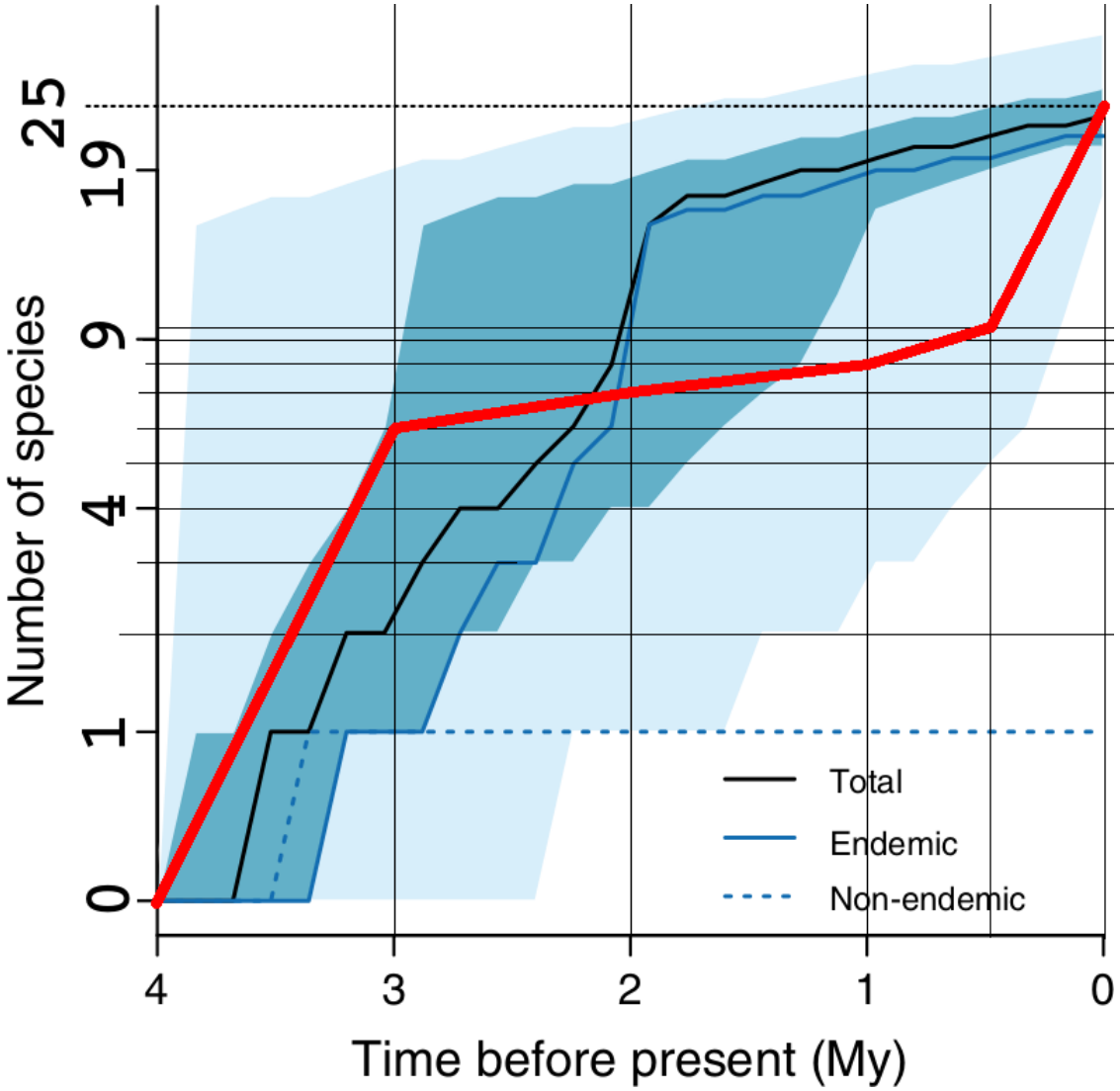
Modified from Valente et al. (2015)

Figures



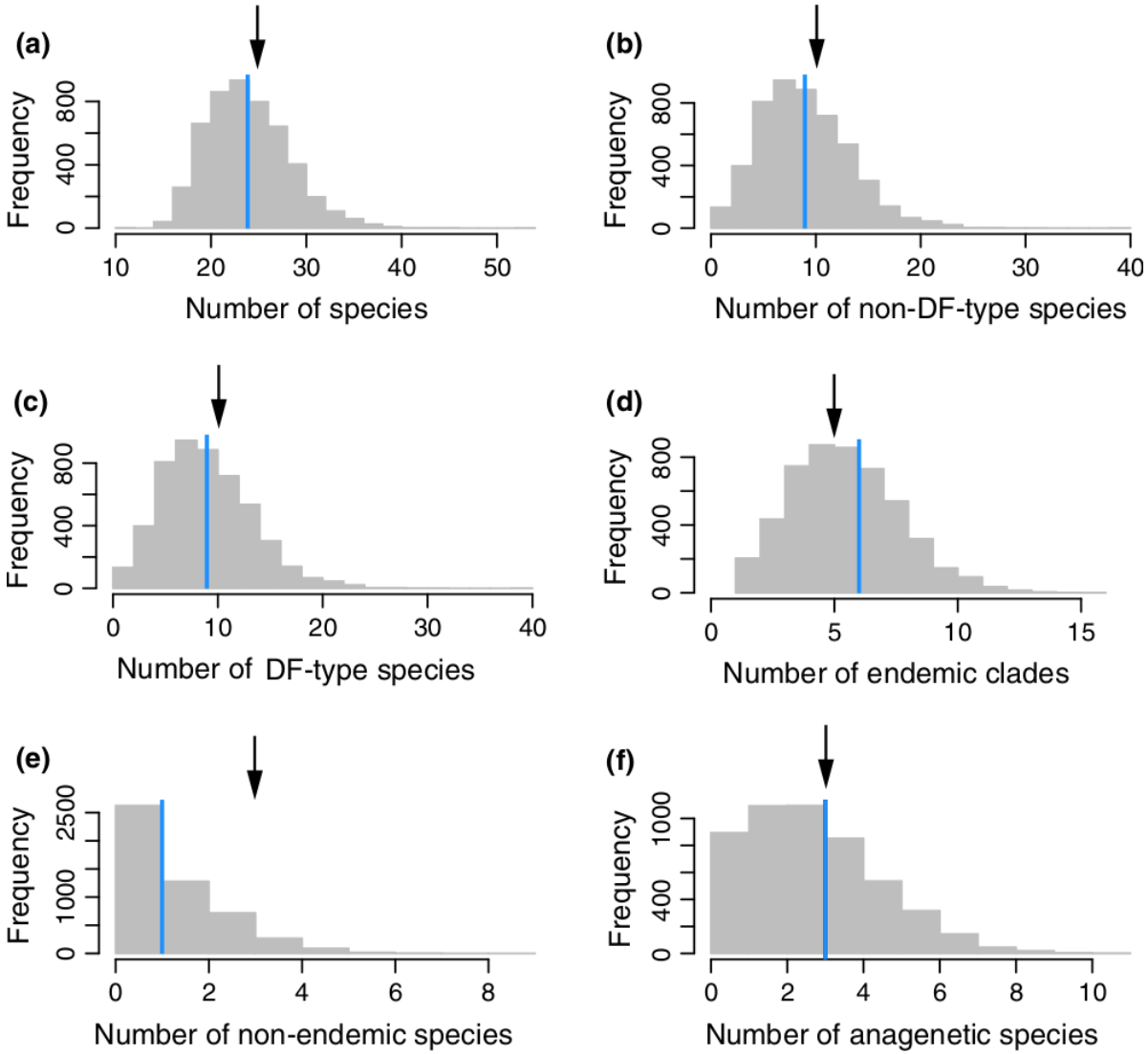
Modified from Valente et al. (2015)

Figures



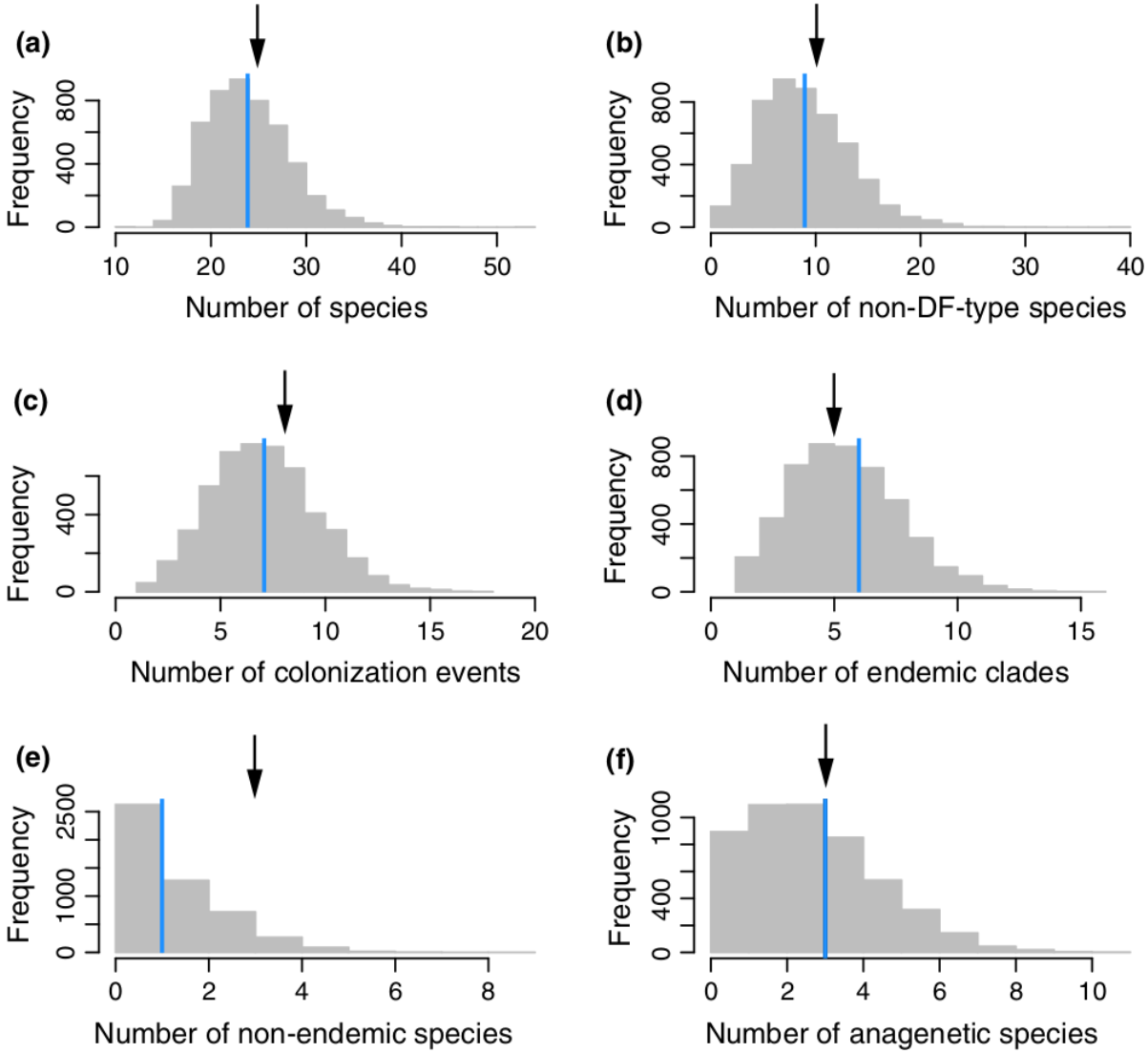
Modified from Valente et al. (2015)

Figures



Modified from Valente et al. (2015)

Figures



Valente et al. (2015)

My claim

The Galapagos are a bad illustration of DAISIE, because (1) the final result is weak, and (2) the figures oversell the story

(1) there is no unification

(2) ugly results are omitted

Questions

What do you think?