



UH Systematics fall 2021:

Biogeography



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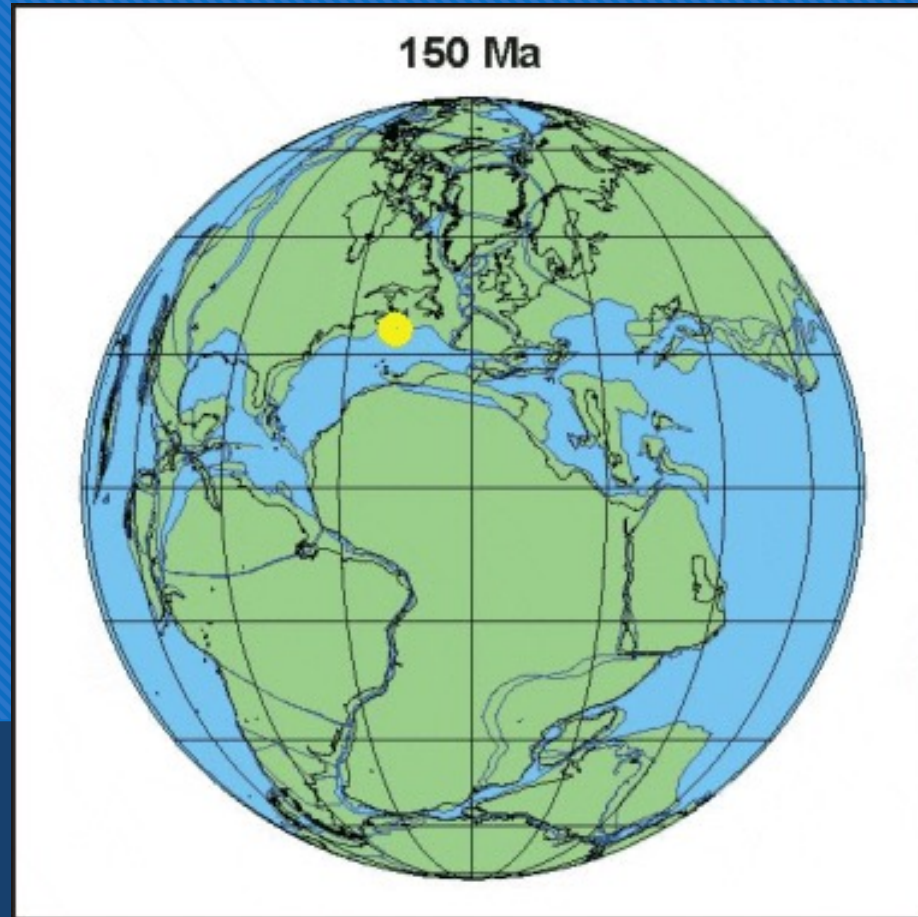


Alfred R. Wallace

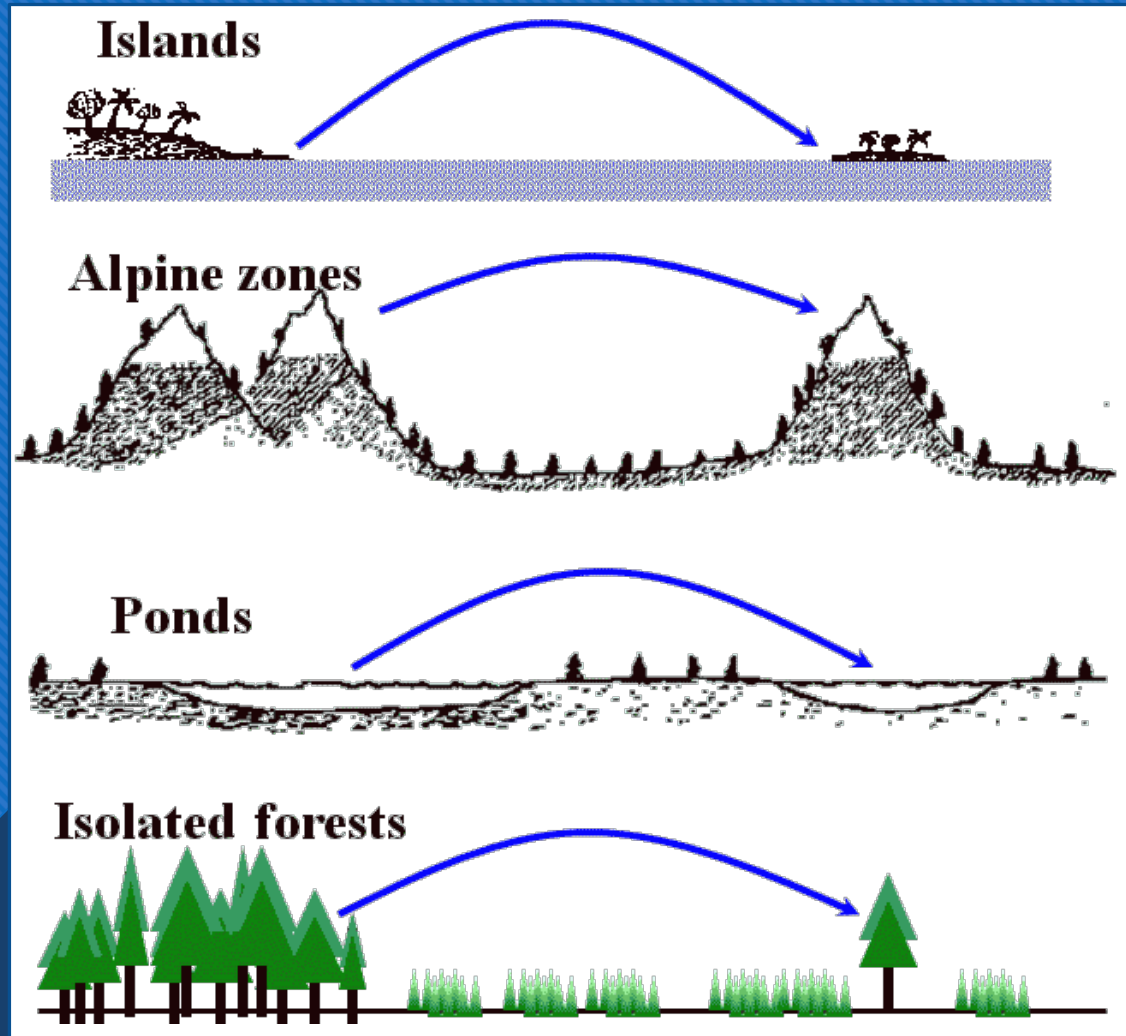
Zoogeographic regions and some characteristic animals



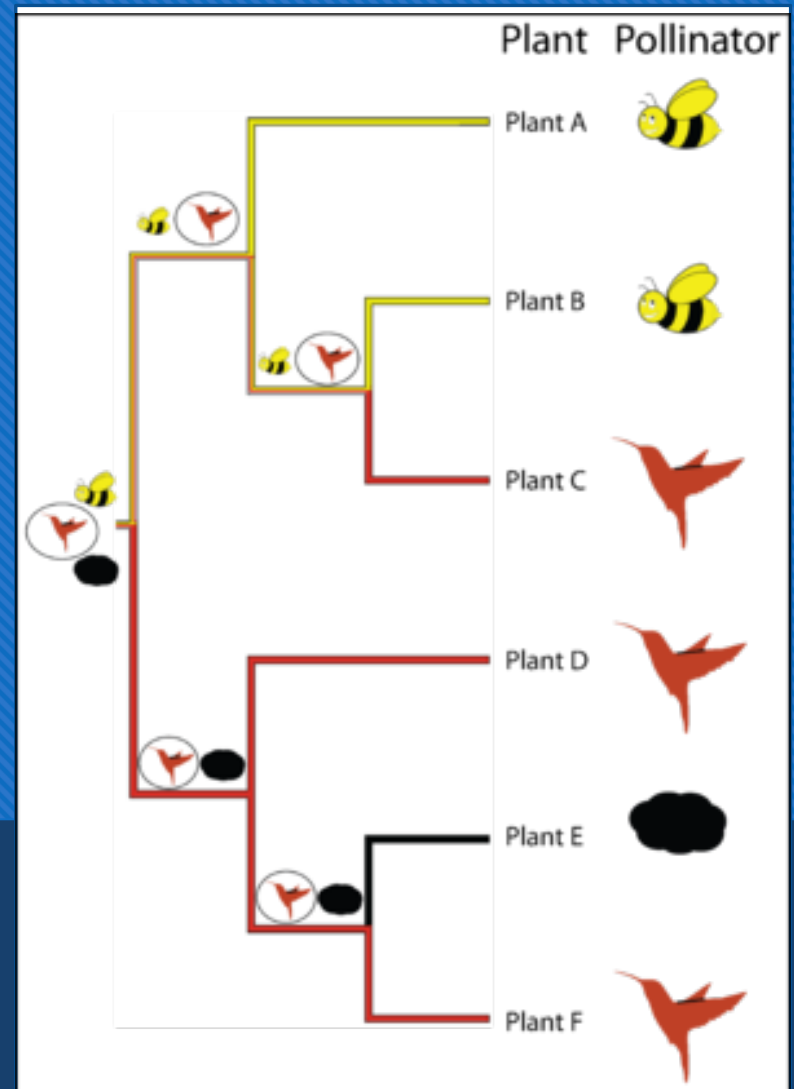
Plate tectonics shaped biogeographic patterns



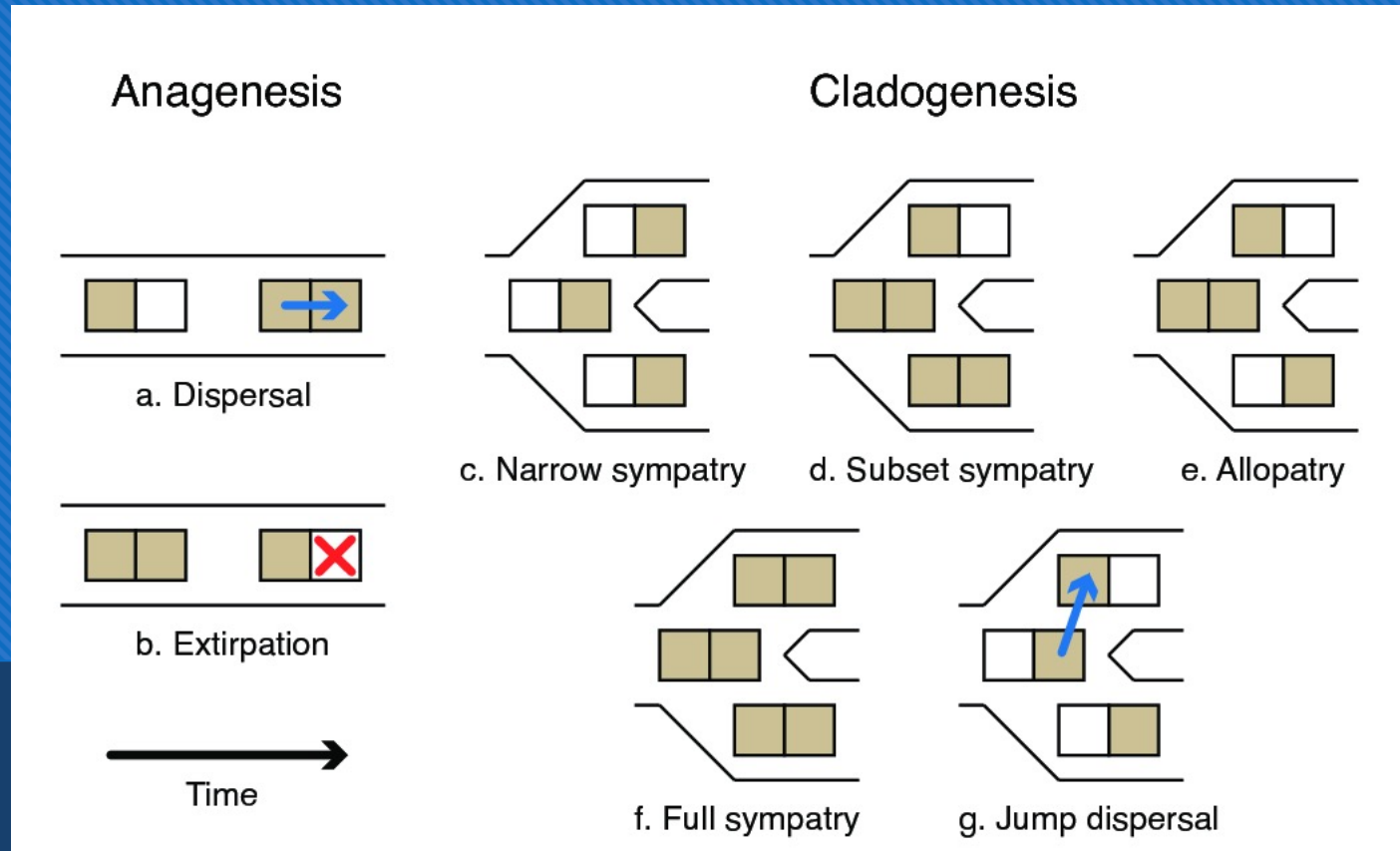
Region definition depends on organism and scale



Biogeography is a special case of character state evolution



Anagenesis & cladogenesis



Selecting a model

	Process	Ranges Before After	Character mapping	DIVA	DEC (GeoSSE, LAGRANGE)	BayArea, BBM (RASP)	Parameter of BioGeoBEARS Supermodel
Anagenetic	Dispersal			✓	✓	✓	d (& x, b)
	Extinction			✓	✓	✓	e (& u, b)
	Range-switching		✓				a (& x, b)
Cladogenetic	Sympatry (narrow)		✓	✓	✓	✓	y (& $mx0ly$)
	Sympatry (widespread)					✓	y (& $mx0ly$)
	Sympatry (subset)				✓		s (& $mx0ls$)
	Vicariance (narrow)			✓	✓		v (& $mx0lv$)
	Vicariance (widespread)			✓			v (& $mx0lv$)
	Founder						j (& $x, mx0lj$)



Conceptual and statistical problems with the DEC+J model of founder-event speciation and its comparison with DEC via model selection

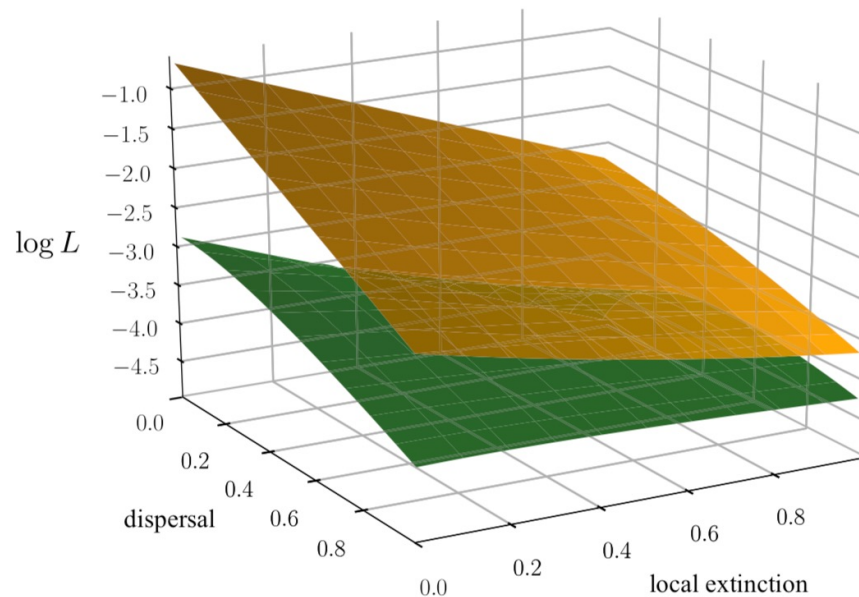


FIGURE 2 Likelihood surfaces for DEC (lower) and DEC+J (upper), for sister species endemic to areas A and B (Figure 1). The

Further model parameters: Hawaiian silverswords example

ORIGINAL ARTICLE

doi:10.1111/evo.13594



Retracing the Hawaiian silversword radiation despite phylogenetic, biogeographic, and paleogeographic uncertainty

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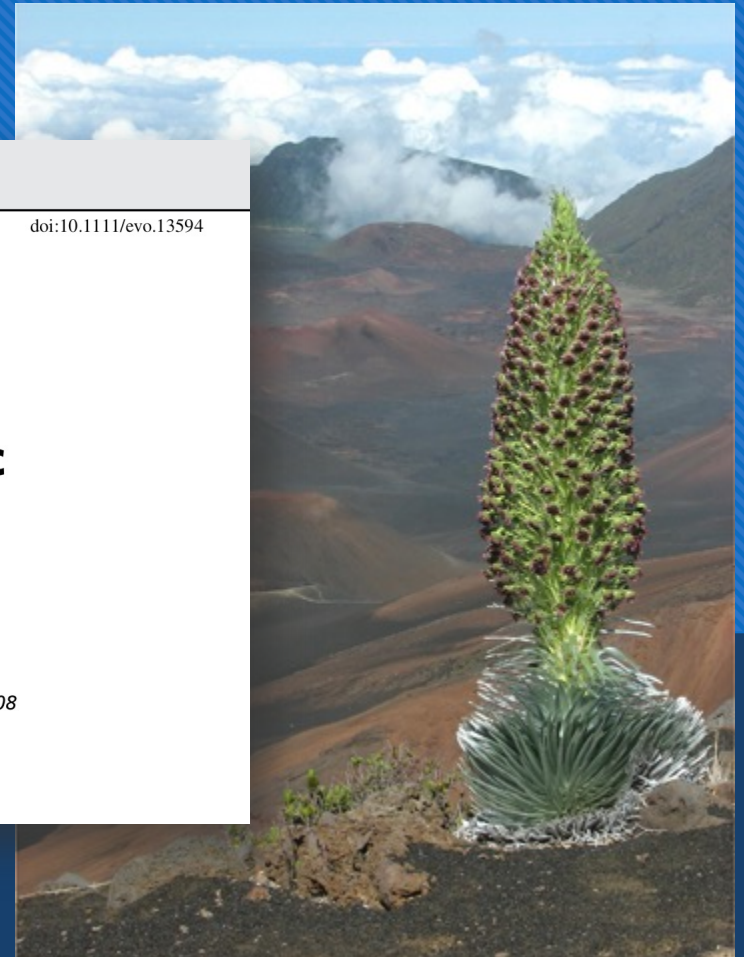
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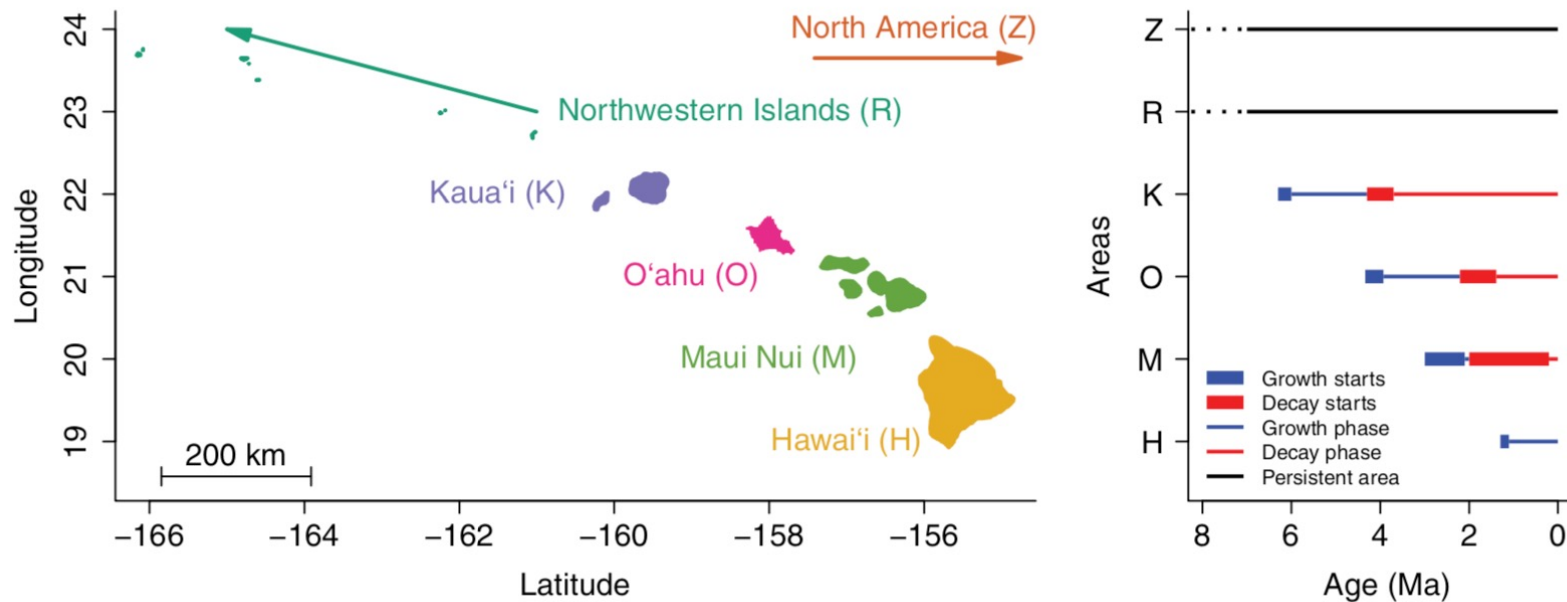
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The Hawaiian archipelago: Progression rule?



References

- Ree RH, Sanmartín I (2018) Conceptual and statistical problems with the DEC+J model of founder-event speciation and its comparison with DEC via model selection. *Journal of Biogeography* 45: 741–749. <https://doi.org/10.1111/jbi.13173>
- Landis MJ, Freyman WA, Baldwin BG (2018) Retracing the Hawaiian silversword radiation despite phylogenetic, biogeographic, and paleogeographic uncertainty. *Evolution* 72: 2343–2359. <https://doi.org/10.1111/evo.13594>