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What do we think the relationship is between dispersal potential and population genetic structure?

A number of years ago, I became interested in the differences and similarities in patterns of diversity among realms. This interest grew in part out of trying to understand the causes of differences and similarities in patterns of diversity among places and taxa within marine systems. Since then, I have encountered at times contrary opinions on what is the state-of-knowledge regarding the relationship between dispersal potential and population structure. I thus got to wondering what, in fact, does our community think? Consequently, in the past year, I have started asking audiences a question before I begin each talk: “What is the strength of the relationship between dispersal ability and population genetic differentiation (e.g., F_{st} , D_{est})?”

For predominantly marine audiences, I substituted ‘pelagic larval duration’ for ‘dispersal ability’ given the former’s dominance in the literature, although it is only one of multiple factors affecting dispersal ability. Members of the audience were requested to choose from one of five responses (below) and abstentions were discouraged. The outcomes of these ad hoc surveys may be generally informative, and might be more so if ‘crowd sourced’, so I report the first few here (Table 1).

The actual relationship between dispersal potential and population genetic structure (and other factors) remains a topic of considerable research effort. So, in addition to setting the scene for your talk, and engaging the audience in the topic, these ad hoc polls might be generally informative about prevailing opinions, whether opinions differ by audience, and whether opinions change through time. Best results are achieved by enlisting an colleague to take photographs and instructing the audience to raise their hands high! I thank the three audiences for participating enthusiastically in these polls and for subsequent discussions of dispersal and gene flow.

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Table 1. Three surveys suggesting how we think dispersal potential and population genetic structure are related.

	WSN ²	IBS ³	RTC ⁴
Very strong ¹	0	~5	~3%
Strong	12	≥ half-dozen	~10%
Modest / weak	36	a dozen – 1 score	~25%
Very weak	1	none	~25%
Don’t know	1	~half-dozen	~35%

¹In all surveys, the categories are presented in two ways (i.e. very strong = predictable/repeatable; strong = mostly predictable & repeatable; modest/weak = sometimes consistent with predictions; very weak = unpredictable & varied) and explained in full before voting. ²WSN: Western Society of Naturalists meeting, Oxnard, California, USA (early-November 2013). The WSN audience is predominantly composed of marine ecologists and also evolutionary biologists with diverse taxonomic and topical interests. ³IBS: IBS Special Meeting in Montreal, Quebec, Canada (mid-November 2013). This IBS audience was predominantly non-marine with a self-declared interest in the geography of species associations. ⁴RTC: Romberg Tiburon Center, the marine laboratory of San Francisco State University (California, USA), departmental seminar (mid-February 2014); $n \approx 30-35$.