Statistical ecology: everything we know isn't wrong

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Abstract: Debates over which statistical methods to use and which paradigm to follow have become increasingly polarised in ecology over recent years. But the lack of agreement may be due, at least in part, to fundamental misunderstandings or even forgetting what we already know. The controversy surrounding AIC and the recommendations found in Burnham and Anderson (2002) is a case in point; a simple appeal to asking "What are we modelling *for*?" is sufficient to resolve the situation, taking inspiration from Shmueli (2010). As a second example, concern has been expressed over reproducibility of scientific findings—a technical examination is found in Johnson (2013)—but discussion has focussed on significance rather than power.
Elsewhere in this conference, Ben Bolker will be discussing when novel statistical methods should be used and when not; a related but inverse question is: why am I often criticised for **not using** "fancy statistical methods"? New methodology should augment, but not necessarily supplant older methods; my being told (a) to use mixed models with only five groups, or (b) use GAMs for a set of binary explanatory variables suggests that some have forgotten what we already know. Appropriate methods are not "old school" or "outdated" (both actual criticisms received) simply because they weren't developed in the last ten years.
A brief discussion on the above will also consider the fledgling "data science" and where statistics as a discipline fits in (or should fit in).

References

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Johnson, V.E. (2013) Revised standards for statistical evidence. *Proceedings of the National Academy of Sciences*, 110:19313-19317.

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