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Taxonomic certification versus the scientific method

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Over the last 30 years or so there has been an increasing need for organism identification services. This has been the positive result of increased habitat monitoring, particularly as regards water quality. Organism diversity and community structure are used as an overall meter stick of habitat health and functionality, in a method referred to as biomonitoring. To meet the organism identification need, private and government laboratories specializing in identification work have been developed, particularly in North America, Europe and Australia. I myself have worked in this industry and was employed in either government or private laboratories over the last 18 years. These laboratories primarily identify benthic aquatic invertebrates, periphyton, phytoplankton, zooplankton and fish (both freshwater and marine).

Aquatic biomonitoring is a primary tool of regulatory agencies in measuring water quality. Comparisons between biomonitoring datasets are not possible without standardization; without data standardization the data become subjective. Actions based on biological data require standards of comparability and repeatability. Therefore, it is paramount that identification practices are standardized as they apply to biomonitoring.

Unfortunately, poor identification services are a widespread and significant problem in biomonitoring. This is a direct result of a paucity of competent workers who are able to identify the specimens, compounded by resource managers who seem to assume that anyone with a microscope and a few taxonomic texts is qualified to perform identifications, or are required to contract out to laboratories that provide the lowest bid, rather than greatest qualifications. Some managers seem not to care about valid names, but rather just want a name for a category. Even worse is when one worker is proficient in one group, they or their supervisors assume that they can easily be proficient in other groups, often with little or no training for these new groups.

In an attempt to elevate the quality of identification data, a number of different organizations have suggested or implemented some form of "taxonomic certification" program; for example AUSRIVAS (2009) in Australia and the North American Benthological Society (2009). Philip Boegh of Copenhagen University makes the bold statement that his method of taxonomic certification is intended to "support scientific literacy and to strengthening [sic] the science by combining self training and gentle control" (Boegh 2009).

This idea of taxonomic certification comes from one of two fundamental misconceptions; either the proponents do not understand scientific method or they think that taxonomy is not a science. As many taxonomic certification proponents are regulators and not scientists, the first misconception is easily understood: most regulators are not trained in the sciences. The latter misconception should be easily corrected: unequivocally taxonomy is science (by way of examples: Linsley & Usinger 1959, Winston 1999, Lipscomb et al. 2003, Wheeler 2004, Will & Rubinoff 2004, Dayrat 2005, Will et al. 2005).

The misconception that taxonomy is not a science has been exacerbated by the misunderstanding in the biomonitoring world of what defines a "taxonomist". The misunderstanding began with the idea that traditional taxonomy is limited to descriptions, rather than pattern oriented investigation using the scientific method (Franz 2005, Padial & De La Riva 2007, Wheeler 2007, 2008). This was confused further in the biomonitoring community by Stribling et al. (2002) who incorrectly defined individuals who professionally identify biomonitoring sample organisms as "bench taxonomists". Taxonomy, as defined by Mayr & Ashlock (1991) and Torre-Bueno (1989), is the practice of classifying organisms and the arranging of species and groups thereof into a system that exhibits their relationship to each other and their places in a natural classification. What Stribling et al. (2002) have misunderstood is that taxonomists do not identify organisms, they describe and classify them. The so called "bench taxonomist" is not doing any taxonomy, but is instead identifying organisms by applying the classification system that taxonomists developed. This error is akin to equating the mechanic who repairs an automobile with the engineer who designed and constructed the automobile in the first place. Yes, the mechanic can be an engineer, but there are far fewer engineers than there are mechanics. It takes a great deal more training and knowledge to be an engineer. A better term for the individuals described by Stribling et al. (2002) would be "identification specialists" or "diagnosticians". Greatly over simplified, the taxonomist identifies and classifies organisms, describing and creating taxa through comparative anatomical analyses and morphological diagnoses, which are