

Our science columnist **Massimo Pigliucci** on a long-standing problem in biology and how philosophy helps.

## Wittgenstein Solves (Posthumously) the Species Problem



# Science

**B** iologists and (some) philosophers seem to share an obsession: they apparently never tire of discussions about the nature of biological species. What exactly *is* a species? If you happen to enroll in graduate studies in ecology, evolutionary biology, or philosophy of biology, the likelihood that you will have to sit through a semester-long seminar on the topic is high indeed. Moreover, you will probably leave that seminar with little more understanding of what species are than when you entered it.

And yet, the ‘species problem’ is certainly fundamental to biology, and hence to philosophy of science. It is not by chance that Darwin titled the most important book ever written in biology (and possibly in the whole of science), *On the Origin of Species*. It isn’t that people don’t have a choice: a recent count by R.L. Mayden lists a whopping 21 different concepts of species proposed in the literature! Part of the problem is that biologists (and some, but not all, philosophers) keep adopting an *essentialist* concept of species: there *has* to be one right way to think of the problem, and hence one unique solution, which we would surely find if only we had more data (say biologists) or thought a bit harder (say some philosophers).

The trouble with this view is perhaps clear if one considers the most popular such proposal: the so-called ‘biological’ species concept (what concept of species would *not* be biological, one wonders?) originally articulated by Theodosius Dobzhansky and Ernst Mayr in the 1930s and 40s. The idea is that members of the same species are recognizable as such because they can actually or potentially interbreed with one another. Even a superficial critical analysis of this concept cannot fail to notice that ‘potential’ interbreeding opens up a Pandora’s box of conceptual problems. But one need not go that far in order to find trouble. By that definition, all bacteria, many plants, and a wide array of living forms simply cannot have species, because they don’t reproduce sexually (and therefore cannot ‘interbreed’,

potentially or otherwise). This is a spectacular case of throwing out the baby with the bathwater.

Similar limitations apply to other definitions of species suggested over the years, and this has eventually led some philosophers and biologists (B.D. Mishler, M.J. Donoghue, P. Kitcher, and J. Dupré, to mention a few) to take a pluralist approach to the puzzle: why not accept the idea that there are *many* ways to think about species, and that different biological problems may require the adoption of distinct species concepts?

There is another, though not necessarily incompatible, solution, which makes use of the work of philosopher Ludwig Wittgenstein. In his *Philosophical Investigations*, Wittgenstein proposed the idea of cluster, or ‘family resemblance’, concepts: some terms by their nature do not admit of an essentialist definition, but are rather characterized by a diffuse network of more or less loosely interconnected properties. Any particular instantiation of the concept may draw on a subset of such threads, even though there is a limit to such conceptual ‘plasticity’. Wittgenstein’s famous example is the idea of a game: the more one thinks about it, the more it is clear that it is difficult to list a set of characteristics that are necessary and sufficient to define what we mean by ‘game’. Board games like chess or monopoly clearly have more features in

common than any of them has with ball games like soccer or basketball, and yet we meaningfully refer to all of these activities as ‘games’.

To put it as the master did: “How should we explain to someone what a game is? I imagine that we should describe games to him, and we might add: ‘This and similar things are called games’” (*P.I.*, para. 69). ... “But this is not ignorance. We do not know the boundaries because none have been drawn ... We can draw a boundary for a special purpose” (*ibid.*).

The same holds for species. Not only special purposes (like the very different works of a paleontologist and a geneticist), but also different classes of living organisms (a bacterium vs. a reptile) may require us to think of species as concepts made of a loose cluster of characteristics, some of which turn out to be particularly useful – while some do not apply – in any given circumstance. As biologist Alan Templeton famously put it, if one insists on using a single (essentialist) criterion to define species, like interbreeding in the case of the Dobzhansky-Mayr proposal, “the problem, as it is often the case, is sex: either too much or too little”, meaning that whatever unique criterion one chooses ends up being too tight or too loose for a vast class of biological organisms.

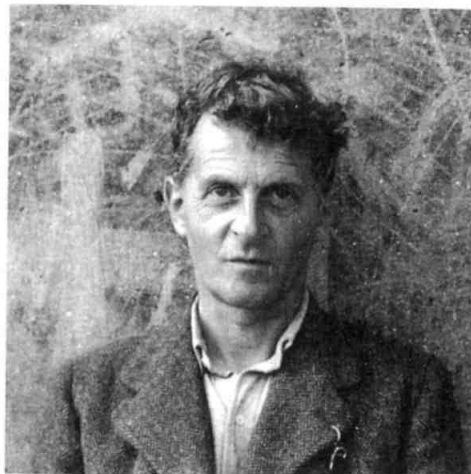
Of course, a Wittgensteinian dissolution of the species concept is unlikely to provide practicing biologists with answers to specific empirical questions (“does this individual belong to species X or Y?”). Then again, philosophy was always meant to clarify conceptual issues, not to solve empirical problems. For the latter, science usually suffices.

© DR MASSIMO PIGLIUCCI 2005

Massimo Pigliucci has a PhD in evolutionary biology and one in philosophy. He is a professor at SUNY-Stony Brook on Long Island, New York. His ramblings can be found at [www.rationallyspeaking.org](http://www.rationallyspeaking.org).

### Further reading:

• M. Pigliucci, 2003. ‘Species as family resemblance concepts: The (dis-)solution of the species problem?’ *BioEssays* 25:596-602.



Ludwig Wittgenstein: Worried about games