# The methods actor: part 2



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As described in Part 1 (*Front Ecol Environ* 2004; 2(2): 106–107) Beth, a new post-doc, recently joined a lab run by Clint, whose research on competition focuses on the biennial herb *Boxov pandora*. She has already had some questions about the unreported practice of removing stinging nettles from field sites.

While Beth has been learning about the actual field practices of the lab, she has also worked on an analysis of the old leaf miner data. She decides to ask Clint about the nettle removal when she meets with him to discuss the leaf miner analysis. She has reviewed all of the published work on the *B pandora* project, paying particular attention to the methods, and found no mention of the stinging nettles. However, the introductions routinely emphasize the importance of conducting competition experiments in the natural environment, and an early "News & Views" article in *Science* pointed out that this is a major strength of Clint's work.

"Clint, before we talk about the leaf miner results, I want to ask you about something Andy said about field protocols."

"Sure, Beth. Shoot."

"Well, going all the way back to the 1987 paper in *Ecology*, you've said that the *B pandora* work has been done in the plant's natural environment, and you stressed the importance of that when I began discussing this project with you. But Andy says you guys have been removing stinging nettles all along. They sure seemed common out there. Doesn't that make the environment unnatural?"

"It's not like we're doing the experiments in a greenhouse. That's a relatively minor change, just for our convenience. It's still outside, in the natural environment."

"Okay, but isn't it possible that the nettle removal, even if it was just done for convenience, affected the outcome of the experiments? I mean, shouldn't they be mentioned in the project's methods?"

"Oh, I don't think so. Sure, the nettles seem common, but they make up only a small portion of the community aboveground biomass, so mentioning it would just needlessly raise red flags with reviewers. Explaining why it doesn't matter would just take up a lot of space. It's just not worth it. So, what have you found out about leaf miners?"

"I'm still not convinced that the nettles are unimportant. It just seems dishonest not to–"

"Dishonest? Oh, come on, Beth, you're being silly. No one ever reports all the tiny little details about methods – it would just be too tedious. We've been doing this for over 15 years, and no one else has ever mentioned that it needs to be reported. Are we done with this now? I'm really interested in hearing what you've found out about the leaf miners."

Q *What should Beth do now? Should she let the matter drop? When it comes time to write a manuscript or give a talk about leaf miners, should she mention the nettles?*

Q *Is failure to report convenience manipulations unethical? Why, or why not? What kinds of manipulations do and don't need to be reported?*

Q *Suppose that, at the beginning of the long-term project, Clint did some pilot studies indicating that nettle removal had no effect on the responses he was studying, but never thought they were worth publishing. Does that justify not mentioning it in the methods?*

Q *Suppose that Beth meets Lillian, Clint's first grad student, at an ESA meeting. Lillian says that she was also worried about the role of nettles, but on all three of the papers she wrote with Clint, he edited them out of draft manuscripts, saying they'd just "raise red flags" with reviewers. Would this affect your view of whether Clint is presenting his research ethically?*

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## Commentary on "The methods actor, part 2"

In part 1 of this case, we met Beth, a new post-doc in Clint's lab, and Andy, the lab's technician. Beth learned that stinging nettles were removed from the field sites, but that this had been unreported and may be important to the interpretation of the project's results. In the commentary to part 1, we focused on the issue of what someone should do when they find themselves questioning the research practices of others. Here we see Beth opt for a reasonably good course of action by asking Clint about the reporting of the nettle removal after verifying the facts. Furthermore, we get some information on Clint's perspective (which we didn't have in part 1). For this discussion, we want to focus on the ethics of methods reporting. Has Clint been unethical by failing to report the removal of the stinging nettles?

When leading a discussion of this case, it may be useful to have participants think generally about aspects of methods that obviously do need to be reported (eg what the experimental treatments are) and things that do not (eg which field workers wore Chicago Cubs baseball caps on July 11th), and work towards the murky middle. This case should provide a vehicle to discuss the gray areas of methods reporting, both in terms of how to determine whether something should be explained in methods, and whether a substantive omission is unethical. As written, it is possible to argue that nothing unethical has been done (except for the scenario posited in the last question) and that no substantive fraud has been committed. This is possible because much depends on what Clint believed and intended in his reports of his research. Our goal is for this discussion to center on the circumstances under which Clint should be judged favorably or unfavorably.

The basis for determining whether to include something in methods is deciding whether it is likely to influence the results, their interpretation, or their repeatability by a qualified researcher. In the absence of such influences, mentioning something is probably unnecessary. For example, if Andy and the field crew wore insect repellent when planting seedlings, it is remotely possible that this influenced seedling establishment. Mentioning this in the methods section of a manuscript would indeed raise red flags with reviewers. If researchers know of a plausible mechanism of effect, the repellent (and the mechanism) should be mentioned. Because there are no all-encompassing rules to know the likely magnitude of effect a methodological detail has on research, these decisions depend on a scientist's educated judgment. Furthermore, the repeatability criterion depends on some assumption about what constitutes a "qualified researcher": any credentialed ecologist, or someone with experience in the habitat? As the case is written, Beth believes there is a plausible mechanism whereby the unmentioned nettle removal could influence the results and their interpretation. Whether Clint has been aware of this mechanism or agrees with her assessment is less clear, although he appears to have some data on nettle abundance, indicating he may have considered this issue in the past.

One issue relevant to whether the removal should have been mentioned or not is what exactly the questions and conclusions have been in Clint's research program. These are deliberately left vague so that a discussion leader can explore whether these manipulations always matter, or whether they only matter in the context of certain questions. For example, if Clint's research has been on competition between two different structural morphs of *B pandora*, the exact composition of the other plant species in the community may be unimportant. On the other hand, if Clint's work has been on how different life stages of *B pandora* are affected by the surrounding community, the removal of a common species may be quite important.

A second issue is what "natural environment" means. Conducting clean ecological experiments in natural environments is notoriously difficult and, consequently, highly regarded. It is possible that exaggerations of the naturalness of an experiment could lead to an unwarranted confidence that the results reflect the true operation of wild organisms. But whether Clint has been exaggerating the importance of his research again relates to the questions he asks. He apparently views greenhouse studies as a benchmark against which to measure his work, and by that standard his work is clearly more natural. Beth, however, seems to see the untouched wilderness as a benchmark. Experimental ecology, almost by definition, involves some alteration of the natural world. Which benchmark is appropriate (are other benchmarks possible?), and how much detail needs to be given in comparison to the benchmark, varies with what questions are asked and what conclusions are drawn. You may find it helpful to ask your discussion group at what point terms like "natural environment" no longer apply.

A discussion of this case could move into issues associated with long-term ecological research. One possibility is "methods myopia". Clint's reputation and career are built on this project and he may staunchly oppose changing methods (for example, in Beth's new project) or reinterpreting them. (It is possible that it had never occurred to Clint that the convenience manipulations could be relevant to his questions.) Alternatively, Clint could view Beth's proposition that the convenience manipulations matter as an opportunity for a new grant to address them directly and enable a reconsideration of old conclusions in terms of greater understanding. Over the course of long-term research, new technology and ideas may arise that allow or suggest possible improvements in how the research is conducted. Such changes come at a cost, by possibly diminishing the significance of early results and complicating their comparison to later results. Conflicts of interest could arise if Clint believes that protecting his reputation is at odds with pushing his lab to do the best science possible.

Part 1 of "The methods actor" appeared in the March issue. This is the eighth in our Ethical Issues series. For the introduction, please see the August 2003 issue (2003; **7**: 330–33).