

Science AMA Series: We are the Society of Environmental Toxicology and Chemistry (SETAC) Europe: Ask us anything about environmental toxicology and chemistry!

SETAC_{Europe}¹ and *ScienceAMAs*¹

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Abstract

The Society of Environmental Toxicology and Chemistry (SETAC) Europe is hosting the 28th European annual meeting this week in Rome, Italy and has asked experts from across academia, government and industry to answer questions on an array of environmental issues and human health. We will have experts across a range of environmental science topics, pesticides, chemical risk assessment, microplastics, nanotechnology, personal care products and pharmaceuticals (in the environment), endocrine disruptors, metals in the environment, environmental disasters (such as oil spills), alternatives to animal testing, science communication and many more. – we'll try to get you the best possible answers according to the latest science. Please do note that we are asking members of the society who represent researchers from a variety of disciplines and sectors; the answers are not official SETAC positions. We encourage discussion and debate! Just please keep it professional. For more information on SETAC go to www.setac.org Post your question and the organizers of the conference will find someone to answer it as soon as possible. Answers to questions will begin at 2 PM CEST, Rome time (1 PM /CET, 8 AM ECT/EDT, 4 AM PST, 7 AM/EST) and continue till 6 PM CEST, Rome time (5 PM/CET, 12 PM ECT/EDT, 8 AM PST, 11 AM/EST), with a few breaks.

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What's the best way to protect bees in the environment?

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This is a big question, or really a set of questions. To begin, we must ask, which bees? And from what are we protecting them? And who is the decision maker aiming to protect bees? Let's take the second question first. There is broad consensus in the field of bee conservation that the key threats to bees are (1) habitat loss (especially of floral resources), (2) toxic exposure, and (3) pests/pathogens. It's important to understand that these threats cannot be treated independently; they interact in complex ways that we are only beginning to understand. For example, a bee that is nutritionally stressed will be more susceptible to disease, and both nutritional stress and disease can make a bee more susceptible to pesticide exposure. These threats play out in different ways for different types of bee. Honey bees, probably due to their social behavior, seem to be more resilient to pesticide exposure than wild bees like bumble bees and mason bees, but honey bees are highly susceptible to pest and pathogen infection. Some wild bees (i.e. non-*Apis* bees) are floral specialists, which seems to make them especially vulnerable to habitat loss. The importance of pesticides varies strongly with the landscape context and time of year. For example, bee poisoning regularly happens during the planting of neonicotinoid-treated corn seed, but this phenomenon occurs only during a specific time of year.

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Finally, let's consider the question of who is trying to protect bees. A beekeeper? A homeowner? A farmer? An industry scientist? A government regulator? Clearly, these different parties have different capabilities and responsibilities with respect to bee conservation. For beekeepers, the emphasis should probably fall on managing diseases, both for the sake of their managed honey bees and their wild bee neighbors. The task of the homeowner is to reject the golf course aesthetic of yard management and allow flowers to bloom--they are not weeds to hungry bees. Farmers must balance crop yield with the need to set aside land for conservation and minimize pesticide risk to pollinators and other non-target organisms. The agrochemical industry must be willing to sacrifice short-term profits to protect long-term conservation objectives. Regulators perhaps have the most difficult job of all, balancing the needs of farmers, industry, and conservation within the constraint of legal mandates.

I hope this complicated answer helps to clarify the issue a little, and I hope everyone comes away with an idea of what can be done within their particular sphere of influence and responsibility.