

My View

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My view begins with the assumption that weed science historically has and continues to be primarily a “reactive” science. A science responding to current needs but failing to make long-term thinking an essential component. In his book entitled *The Clock of the Long Now*, Stewart Brand (1999) asks: “How do we make long-term thinking automatic and common instead of difficult and rare? How do we make the taking of long-term responsibility inevitable?” (p. 2). The concept of the “long now” refers to the historical record of how we arrived where we are today and brings into question how current practices, emerging technologies, and human interactions will shape the future of weed science and crop protection in general.

What do you think will happen in the future? Such an important question for weed science, given the speed at which weeds are evolving resistance to herbicides combined with the impact of climate change on invasive plant ecology and plant-to-plant competitive interactions. What answers can we provide as a scientific society? To address this question, I would suggest that our discipline of weed science, and perhaps crop protection in general, needs to have a rigorous debate on the importance of theory development. If we do not have a theoretical underpinning or the ability to predict, do we not risk “all be[ing] washed out to sea in an immense tide of unrelated information” (Watt 1971, p. 569)? Will a focus on theory development deepen our science and provide a cohesive framework from which predictions can be tested?

There are various alternative views on the structure and approach in interpreting what constitutes a theory (see Carpenter 2002; Marquet et al. 2014; Travassos-Britto et al. 2021). As a starting position, I offer the definition provided by Pablo Marquet et al. (2014): a theory is a “hierarchical framework that contains clearly formulated postulates, based on a set of assumptions, from which a set of predictions logically follows” (p. 701). A theory is based on known facts, a collective construct, compiled in a manner that allows for the development of mathematically defined predictions. Will it be possible to shift our discipline from being reactive and very descriptive in nature to being more focused on understanding mechanisms? An understanding of mechanisms and their interactions will open the door for mathematical modeling and theory development.

Theory development will inevitably lead to several questions for debate within our society. Are theoretical frameworks necessary for an applied discipline such as weed science? Are there currently theories in weed science that can be defined? What role should our weed science societies play in gathering the required historical experience, data repositories, and expertise to assist with the formation of potential theories?

As weed scientists, we work in a complex and evolving biological system. Many of us work in the “now,” solving today’s on-farm problems. We must not, however, neglect the future. In my view, the future success of weed science will depend on our ability to answer complex questions regarding cropping systems and environmental challenges. Complex questions that will require a theoretical framework. The “clock of the long now” is ticking!

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