Advances in Weed Science
formerly Planta Daninha

SPECIAL TOPICS   EDITORIAL
Seventy-five years of synthetic herbicide use in agriculture: Will there be 100?"

Editorial: "Seventy-five years of synthetic herbicide use in agriculture: Will there be 100?"

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Herbicide use in agriculture revolutionized weed control and contributed to global food security since the launch of 2,4-D in 1945. However, challenges are arising that threaten the continued effectiveness and viability of herbicides, as well as their acceptance as a tool for weed management. In this special issue, "Seventy-five years of synthetic herbicide use in agriculture: Will there be 100?", experts discuss the history of herbicide use worldwide, the contribution of herbicides to sustainable food production, the contributions that private and public institutions have made to safe and effective herbicide use in agriculture, and the tools that can enhance the lifetime of this important technology, as well as the need to search for new tools for weed management.

The special issue is comprised of thirteen manuscripts focused on the current state and outlook of herbicide usage across various regions of the world. The first part of the issue explores ways to enhance the efficacy of herbicides or integrated weed management alternatives, while the second part proposes solutions to improve the use of herbicides.

The issue also includes several reviews of the current and future state of herbicide use in different regions. Adegas et al. (2022) examine the role of glyphosate-resistant soybean and corn in Brazil. Chauvel et al. (2022) present a history of herbicide use in France, and Merotto et al. (2022) examine herbicide use history and perspective in South America. Thompson and Chauhan (2022), discuss the history and perspective of herbicide use in Australia and New Zealand. Finally, Shekhawat et al. (2022) and Casimero et al. (2022) explore alternatives for assessing and improving herbicide use in intensive agroecosystems of South Asia and southeast Asia, respectively. On another topic, Albrecht et al. (2022) discuss the agronomic implications of paraquat banning in Brazil.

Besides those topics, the special issue includes alternatives to enhance herbicide lifetime, including one extensive review on herbicide mixture (Barbieri et al., 2022) and (Kniss et al., 2022) analyze the cost of implementing effective herbicide mixtures for resistance management.

Powles (2022) presents an opinion on where future herbicide discovery will come from. On the innovation side, Duke et al. (2022) explore the potential roles of natural compounds and microbial bioherbicides in weed management while Zabala-Pardo et al. (2022) discuss the potential of using RNAi as a tool for weed management, presenting the main challenges and opportunities that this technology will provide.

In summary, this special issue provides a comprehensive overview of the history and perspectives of herbicide use in agriculture, as well as the challenges and opportunities facing this important technology. It highlights the need for continued research and innovation to ensure the effectiveness and viability of herbicides in the future, as well as the need to explore new tools and approaches for weed management in the face of increasing problems with herbicide resistance and environmental concerns.

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