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2009 : February 2009 - Fast Breaking Papers : Regina G. Belz

FAST BREAKING PAPERS - 2009

February 2009



Regina G. Belz talks with ScienceWatch.com and answers a few questions about this month's Fast Breaking Paper in the field of Agricultural Sciences.



Article Title: Allelopathy in crop/weed interactions - an update

Authors: Belz, RG

Journal: PEST MANAG SCI

Volume: 63

Issue: 4

Page: 308-326

Year: APR 2007

* Univ Hohenheim, Inst Phytomed, Dept Weed Sci, D-70593 Stuttgart, Germany.

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SW: Why do you think your paper is highly cited?

The prospect of "crops that fight weeds," in terms of crop plants that exude natural herbicides to suppress competing weeds, is attracting increased attention. The potential economic and environmental benefits may be striking if this trait is exploited in much the same way as defense mechanisms against insects or pathogens.

The paper catches the wave of exciting recent advances in this research area which have been achieved by scientists all over the world during the past decade and identifies future research needs and prospects. This makes it a valuable resource in the field of agricultural applications of allelopathy. Allelopathy involves a plant's secretion of biochemical materials into the environment to inhibit germination or growth of surrounding vegetation.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

The review integrates multiple and diverse recent findings in crop allelopathy research, leading to a comprehensive, profound overview of the state of knowledge in crop/weed interactions. Moreover, the integration of various findings led to a new understanding of the mechanisms by which crops and weeds interact and allowed us to highlight the features of allelopathy that must be understood in order to fully exploit it for agricultural uses.

SW: Would you summarize the significance of your paper in layman's terms?

A growing public awareness of unwanted side effects from synthetic herbicide applications is pushing the search for alternative weed management methods. One

"The review illustrates that we have a much better understanding of what allelochemicals are produced by most of the important crops and that we are making progress in determining what genes control their synthesis."

possible option is the cultivation of crop plants that can defend themselves by release of natural products to suppress competing weeds. The paper gives an overview of the progress and problems in this research area over the past decade and outlines some new ideas for future progress and research directions.

SW: How did you become involved in this research, and were there any problems along the way?

I have been working on allelopathy issues for almost 10 years and view the questions posed by this phenomenon as crucial to the understanding and exploitation of crop/weed-interactions. However, for several decades the utilization of allelopathy as an agricultural tool was hampered by the scientifically weak nature of much of the published research.

With more rigorous scientists around the world working in this area during the past decade, the situation has improved and new, powerful scientific instrumentation and more sophisticated experimental strategies are now available to put allelopathy in perspective. However, the challenge of weeding with allelopathy still requires us to further refine our methods and to expand the experimental scope much more at field level.

SW: Where do you see your research leading in the future?

The review illustrates that we have a much better understanding of what allelochemicals are produced by most of the important crops and that we are making progress in determining what genes control their synthesis. Still, much more needs to be done to fully understand the functioning and efficiency of crop allelopathy systems and also to develop viable management strategies for weed-suppressive cultivars. This requires a multifaceted, interdisciplinary strategy among breeders, molecular geneticists, weed scientists, agronomists, physiologists, and others.

SW: Do you foresee any social or political implications for your research?

Utilizing allelopathy for weed management could have the greatest impact on synthetic pesticide use of any new technology. If the progress in crop allelopathy research over the past decade can be exploited by plant breeders and molecular biologists over the next decade, we can hope for new crop varieties in the future that can reduce our current heavy dependency on synthetic herbicides.

Regina G. Belz, Ph.D.

Lecturer and Research Assistant

Department of Weed Science, Institute of Phytomedicine

University of Hohenheim

Stuttgart, Germany

Web

Keywords: allelochemical; crop allelopathy; rice; root exudate; weed management; wheat triticum-aestivum; ryegrass lolium-rigidum; rice oryza-sativa; active secondary metabolites; soil degradation dynamics; plant-plant interactions; hydroxamic acid content; secale-cereale I; seedling allelopathy; benzoxazinone allelochemicals.



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