Scientific Review of the Feasibility of Mycoherbicides in Eradicating Illicit Drug Crops

Committee

Raghavan Charudattan

Chair

Raghavan Charudattan (Chair) is professor emeritus in the Department of Plant Pathology at the University of Florida, with over 35 years of service. His major field of interest is the biological control of weeds with plant pathogens. Dr. Charudattan has produced substantial scholarly work including five books, 25 book chapters, and over 90 peer-reviewed journal articles. He served on the NRC Committee on Pest and Pathogen Control through Management of Biological Control Agents and Enhanced Cycles and Natural Processes. His more recent recognitions include Outstanding Weed Scientist from the Florida Weed Science Society in 2006, the Career Achievement Award from the Florida Phytopathological Society in 2007, and the Outstanding Research Award from the Weed Science Society of America in 2009. Dr. Charudattan was elected a fellow of the Weed Science Society of America in 2000 and a Fellow of the American Phytopathological Society in 2005. He is a founder of the journal Biological Control, Theory and Application in Pest Management, was the journal editor from 1991 to 2006, and continues to serve as a member of the editorial board. He is a holder or co-holder of several U.S. patents which include the patent for Phomopsis species fungus as a broad-spectrum bioherbicide to control several species of pigweeds and the patent for the use of Tobacco mild green mosaic virus (TMGMV)-mediated lethal hypersensitive response (HR) as a novel method of weed control. Dr. Charudattan received his Ph.D. from the University of Madras, India.

Joan Wennstrom Bennett

Member

Joan W. Bennett is a professor in the Department of Plant Biology and Pathology at Rutgers University. She is also associate vice president for promoting women in science, engineering and mathematics. Her research interests include fungal genetics and mycotoxins; fungal biodegradation and biotechnology; fungal genomics; bioethics; and history of microbiology. In collaboration with scientists at the Southern Regional Research Laboratory of the U. S. Department of Agriculture, Dr. Bennett has pioneered research on the genetics and biosynthesis of aflatoxins. Her laboratory has been involved in genome projects for Aspergillus flavus, A. fumigatus and A. oryzae. She has held a number of leadership roles in the scientific community, including chair of the biology division of the American Association for the Advancement of Science, president of the Society for Industrial Microbiology, and president of the American Society of Microbiology. She was elected to the National Academy of Science in 2005. Dr. Bennett earned her Ph.D. in botany from the University of Chicago.

Jerome J. Cura

Member

Jerome J. Cura is founder of the Science Collaborative, a resource network of senior environmental and public health scientists from the consulting industry and academia, and was a founding member of Cura Environmental and Menzie-Cura & Associates. His research interests are in ecological risk assessment. He has conducted such assessments in terrestrial environments, freshwater systems, and in marine and estuarine habitats. He has developed guidance for conducting risk assessments at dredging sites and has experience conducting assessments at CERCLA and RCRA sites. Dr. Cura is chair of the Ecological Risk Assessment Specialty Group of the Society for Risk Analysis. He received his Ph.D. in biological oceanography from the University of Maine.

William E. Fry

Member

William E. Fry is professor in the Department of Plant Pathology and Plant-Microbe Biology at Cornell University. He also serves as dean of the Cornell University Faculty. His research interests are in plant disease control and epidemiology, population genetics, host-pathogen interactions, and disease resistance. Of specific interest are the basic biology and management of potato late blight and its pathogen, Phytophthora infestans and the use of genomic approaches and computer simulations to characterize the pathogenicity of populations of P. infestans. His laboratory has characterized the role of biopesticides and “green” fungicides in the management of late blight, demonstrated the potential role of petunia in the epidemiology of late blight, and predicted the epidemiologic impact of exotic strains of P. infestans in the United States. Dr. Fry received his Ph.D. in plant pathology from Cornell University.

Guy R. Knudsen

Member

Guy R. Knudsen is professor of microbial ecology and plant pathology at the University of Idaho. His research interests are in the biological control of plant pathogens using antagonistic bacteria and fungi; soil and rhizosphere microbial associations with indigenous plant species; microbiology of aquatic, riparian, wetland, and soil habitats; fate of genetically engineered microorganisms in the environment; and the prediction and management of fungal epizootics of insect pests. Dr. Knudsen was a member of the National Research Council committee that organized the Workshop on Research to Improve the Evaluation of the Impacts of Genetically Engineered Organisms on Terrestrial and Aquatic Wildlife and Habitats. He received his Ph.D. in plant pathology from Cornell University and his J.D. from William Howard Taft University.

John F. Leslie

Member

John F. Leslie is professor and head of the Department of Plant Pathology at Kansas State University. He has been teaching researchers from around the world how to identify Fusarium species, the diseases they cause, and the toxic compounds they can produce. His broader research interests include biochemical, molecular, and population genetics of model and plant pathogenic fungi. He was a senior Fulbright Scholar at the University of Sydney, Australia. He is a fellow of the American Phytopathological Society and an honorary fellow at St. Paul's College, University of Sydney, Sydney, Australia. He is an adjunct professor at Seoul National University in Korea, and a research associate at the Royal Botanical Gardens in Sydney, Australia. Dr. Leslie earned his Ph.D. in genetics from the University of Wisconsin at Madison.

Nu-May R. Reed

Member

Nu-May Ruby Reed is a staff toxicologist with the California Environmental Protection Agency (Cal/EPA) Department of Pesticide Regulation, where she is the lead scientist on risk assessment issues. Her research interests are in evaluating health risks and developing risk assessment guidelines for pesticides. She has been on several Cal/EPA working groups that initiate, research and revise risk assessment guidelines and policies, and represented her department in task forces on community concerns and emergency response, risk management guidance and public education. Dr. Reed was a member of the NRC Committee on Risk Analysis and Reviews, and is a current member of the NRC Committee on Acute Exposure Guideline Levels. She received her M.S. in botany and her Ph.D. in plant physiology from the University of California at Davis.

Judith C. Rhodes

Member

Judith C. Rhodes is professor in the Department of Pathology and Laboratory Medicine at the University of Cincinnati College of Medicine. Her research interests are in understanding the pathogenesis of fungal infections, with a focus on infection caused by Aspergillus fumigatus. Recent efforts have been directed toward establishing in vitro tissue culture assays to assist in isolating genes that are potentially involved in virulence. Dr. Rhodes is a fellow of the American Academy of Microbiology, a past president of the Medical Mycological Society of the Americas, and a former chair of the medical mycology division (Division F) of the American Society for Microbiology. She received her Ph.D. in microbiology and immunology from the University of California at Los Angeles.

John W. Taylor

Member

John W. Taylor is a professor in the Department of Plant and Microbial Biology at the University of California at Berkeley. He studies the pattern and process of fungal evolution, with a long term goal of making fungi the best models for evolutionary biology. His more recent research emphasis involves using genetics and genomics to find genes that maintain species and facilitate adaptation. He is a former vice president of the International Mycological Association, a former president of the Mycological Society of America, and is a fellow of that society and of the American Association for the Advancement of Science. Among Dr. Taylor's other honors are the award for Distinguish Mycologist from the Mycological Society of America, the Rhoda Benham Medal from the Medical Mycological Society of the Americas, and the Lucille K. Georg Medal from the International Society for Human and Animal Mycology. He received his Ph.D. in mycology from the University of California at Davis.

David O. TeBeest

Member

David O. TeBeest is a professor in the Department of Plant Pathology at the University of Arkansas. His research interests are in the molecular ecology, epidemiology, and genetics of fungal plant pathogens of grain, sorghum, and rice, especially Colletotrichum species, rice blast, and smuts of rice. He also continues to study the biological control of weeds to provide continued refinement to Collego, the world's first bioherbicide developed for use in row-crop agriculture. Recent work has focused on the dynamics of inter-strain competition and host selection factors in strain competition of effective strains. Dr. TeBeest was the recipient of the U.S. Department of Agriculture Award for Superior Service for Pioneering Research and the University of Arkasas's Gamma Sigma Delta Award of Merit and the John W. White Award for Research. He received his Ph.D. in plant pathology from the University of Wisconsin.

Ariena H. van Bruggen

Member

Ariena H.C. van Bruggen is a plant disease epidemiologist and professor of plant pathology at the Emerging Pathogens Institute and the Institute of Food and Agricultural Sciences at the University of Florida. She is involved in fundamental and applied research on the health of ecosystems in relation to invasion by plant and human pathogens. Recent work has focused on pathways and mechanisms through which plant pathogens and microbes move through successive ecosystems as dependent on available resources. Other work has examined the ability of certain organisms in agroecosystems to disperse over time and across space. Her work contributes to the understanding how certain diseases progress and is credited with discovering a new plant pathogen, Rhizomonas suberifaciens. Dr. van Bruggen is the recipient of the Ciba-Geigy Award from the American Phytopathological Society and the the Jakob Eriksson Gold Medal from the Swedish Academy of Science. She received her Ph.D. in plant pathology from Cornell University.

Maurizio Vurro

Member

Maurizio Vurro is a senior researcher at the Institute of Sciences and Food Production at the National Research Council in Italy. His studies have focused on the production, purification, identification, and biological characterization of toxins produced by plant pathogenic fungi and on their role in plant-pathogen interactions. Since 1991, Mr. Vurro began studying the biological control of weeds using fungal plant pathogens and their phytotoxins. His fields of specialization include the isolation and identification of new weed biocontrol agents; production, purification, and biological characterization of phytotoxins produced by weed pathogens; the role of toxins in plant-pathogen interactions; evaluation of the herbicidal potential of phytotoxins; the integration of biological and chemical control strategies; and biological control of parasitic weeds. He coordinated the European Research Project on enhancement and exploitation of soil biocontrol agents for bio-constrain management in crops. Mr. Vurro has served as the coordinator of the Working Group Parasitic Weeds of the European Weed Research Society since 2006. He is the senior editor of Phytopathologia Mediterranea, and serves on the editorial board of the journal Food Security. Mr. Vurro earned his B.Sc. at the University of Bari, Faculty of Agricultural Science.

Alan K. Watson

Member

Alan K. Watson is professor in the Department of Plant Science at McGill University. His research is broadly based in integrated pest management and sustainable agricultural systems while focusing on weed management. His major research interests are: the use of indigenous plant pathogens as bioherbicides; assessment of exotic plant pathogens as biological control agents of introduced weeds; population dynamics of weed species with emphasis on herbaceous perennials; and the development of integrated weed management systems in temperate and tropical regions. His research program seeks to understand the processes involved in host-pathogen interactions, to investigate mechanisms involved in disease development and weed host response, and to use this knowledge to select, develop, and implement effective, safe, and sustainable means to reduce the negative impact of major noxious weeds. His studies span research biocontrol methods for less developed nations and subsistence farmers. His research team successfully developed effective biocontrol strategies for several weeds in rice in Asia, and a Fusarium oxysporum-based bioherbicide against Striga hermonthica, a root parasitic weed that is considered as the scourge of African cereal crops. Dr. Watson earned his Ph.D. in weed science from the University of Saskatchewan.

Charles P. Woloshuk

Member

Charles P. Woloshuk is a professor in the Department of Botany and Plant Pathology at Purdue University. His research interests include corn/mycotoxin pathology, and the genetics, biochemistry, and physiology of mycotoxin biosynthesis. His long range research program goals are to investigate the biosynthesis of various mycotoxins and to develop novel approaches for eliminating the risk of mycotoxin contamination of food sources. He uses mycotoxin-producing fungi as model systems to advance the current understanding of secondary metabolism in fungi. Dr. Woloshuk’s also is involved in the evaluation of mycotoxins associated with grain harvest, storage, and management practices, with an objective to inform and educate the grain producers, handlers, and processors about mycotoxin impacts. He also leads workshops on the use of mycotoxin test kits. He received his Ph.D. in plant pathology from the Washington State University.