USDA, ARS, BELTSVILLE AREA PROGRAMS DIRECTED AT DEVELOPMENT OF METHYL BROMIDE ALTERNATIVES FOR PRE-PLANT APPLICATIONS

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The USDA, ARS, Beltsville Area has responded to the need to identify and develop alternative strategies for soil fumigation, which have been traditionally achieved with methyl bromide, by redirecting several research programs to address this critical problem. A total of six permanent scientists (SY's), along with their support personnel, are currently involved in this effort. These SY's represent several disciplines; plant pathology, soil science, microbiology, and nematology, which provides a range of expertise related to the control of soilborne pathogens. This poster identifies the five projects that are involved in the overall program with their specific objectives, approaches, personnel, and progress to date.

"Methyl bromide alternatives for management of soilborne pathogens in ornamental crops" is focused on developing biologically-based strategies and integrating them into functional integrated pest management systems for effective management of soilborne pathogens in ornamental crop production. A combination of biological, cultural, and physical components will be used to develop an alternative management system for ornamental production.

"Biological and integrated controls as alternatives to methyl bromide of soilborne wilt pathogens" will focus on screening beneficial microorganisms and combining efficaceous candidates with other practices which weaken pathogen propagules, such as sub-lethal fumigation or physical treatments, and development of formulations of these biocontrol agents which are compatible with production systems.

"Biocontrol of soilborne plant pathogens using natural attributes of microbes and their environs" is directed at characterizing naturally-occurring biocontrol systems and identifying the microbes responsible, evaluating these microbes, and identifying the ecological factors and mechanisms influencing biocontrol, for the purpose of exploiting this knowledge in the development of biocontrol systems to achieve disease control.

"Basis of spermosphere and rhizosphere competence of plant beneficial bacteria" is directed at developing strategies to deliver and modulate the growth of plant-beneficial bacteria in the rhizosphere using molecular genetic approaches to improve biocontrol efficacy for commercial applications.

"Identification, metabolism, and bioactivity of hormones and other bioregulators of nematodes" has a long-term objective to investigate major physiological or biochemical differences between nematodes and their hosts, such as steroid metabolism, in an effort to find means to selectively interfere with important nematode life processes such as development and reproduction which could be developed into alternative control strategies.