Concurrent Session 29-Plant Diseases and Control in Protected Cultivation

O29.001 Alternative strategies for the control of soil-borne pathogens of vegetable crops in green house

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The European directive 2009/128/EC on sustainable use of pesticides and the Regulation 1107/2009 on Plant Protection products (replacing the Dir. 91/414/EEC) provide a strong limitation to the use of chemicals, in particular fumigants, in Europe. The agricultural sector is encouraged to innovate and change strategies for crop protection, with the need to revisit the methods of management to satisfy the requirement of environmental sustainability, by the adoption of integrated systems that combine, in a rational way, chemical, physical, genetic, cultural and biological control strategies. Some examples of the experiences carried out in Italy are reported. Trials have been carried out to evaluate the effect of chemical and not chemical disease management strategies to control soil-borne pathogens of solanaceous (pepper and tomato), cucurbit (melon, zucchini and cucumber) and leafy vegetables (lettuce, rocket) crops in Piedmont (Northern Italy). Alternative strategies included the use of suppressive substrates and fertilizers (compost, biochar…), soil solarization, biofumigation, grafting, biological control agents, as well as silicates and management of electrical conductivity in soil-less crops. Different strategies are critically discussed, and new trends for managing soil-borne diseases are suggested.

O29.002 Integrated management of replanting diseases of vegetables in greenhouse in North China

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Replanting of cucumber resulted in deterioration of soil microflora, decline of soil fertility, and serious occurrence of soilborne diseases caused by *Fusarium* spp., *Rhizoctonia solani*, and *Meloidogyne incognita*. We developed an integrated management of the problems to re-establish beneficial microflora of the continuous cropping soil. Three delivery systems of BCAs of *Bacillus subtilis, Gliocladium roseum* and *Paecilomyces lilacinus* are developed. The first way is to sprinkle BCAs on corn stalk and buried under soil. The treatment could promote plant growth, increase the soil temperature at 20 cm depth by 5-8℃ in winter, reduce disease incidence and enhance the yield by 30%, in comparison with "no treatment". The 2nd way to introduce BCAs into vegetable rhizosphere is to mix them into nursery substrate. Concentrations at 10^7 and 10^5 cfu/g matrix for bacterial and fungal BCAs, respectively, could promote seedling growth and suppress root diseases significantly, and reduce *F. oxysporum* population for 10 times in comparison with the "no treatment", when it was detected by real-time PCR. Wilt disease delayed for 2 weeks, and the control efficacy was 58.6% after transplanting for 5 weeks. The 3rd way is to mix the BCAs into organic manures. Treatment with fugal and bacterial BCA at 2.5×10^5 cfu/g and 1×10^7 cfu/g, respectively, could increase height, stem width and yield of cucumber by 10%, 13% and 19%, respectively, in comparison with the "no treatment". The research suggests a great potential for integrated management of vegetable replanting problems in regions of North China with cold weather.

O29.003 Molecular surveillance and systematic management of bacterial canker in greenhouse tomatoes

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Bacterial canker is one of the most economically damaging diseases of greenhouse tomatoes and outbreaks can be devastating. *Clavibacter michiganensis* subsp. *michiganensis* (Cmm) is seedborne and easily spread mechanically. Molecular fingerprinting tools that exploit Cmm genetic diversity offer the ability to trace strains within production systems. We designed a multivariate matrix using geographical information, propagation and production flow diagrams and varietal and seed source data superimposed with rep-PCR fingerprints and dnaA sequence analysis of Cmm strains. The multivariate matrix allows Cmm phenotypic and genotypic information to be recorded and transmitted at any point in a production system and the point of origin of each strain can be identified. We used the DELPHI process with a panel of experts to identify the most critical points of entry and dissemination of Cmm in tomato propagation and production greenhouses. These include irrigation water, Cmm-infected seedlings (propagation), tools, gloves, footwear, equipment, weeds and volunteer plants, and crop debris. Sampling strategies were designed and implemented to determine the relevance of each of these