55

Molecular identification of a phytoplasma belonging to the 16SrIII group found naturally infecting cassava. Oliveira, AS[1]; Silva, MS[2]; Batista, BCC[1]; Resende, RO[1]. Laboratório de Microscopia Eletrônica e Virologia, CEL/ IB/ UnB, Brasília, DF, Brasil; [2]Laboratorio de Fitopatologia / Embrapa Cerrados, Planaltina, DF, Brasil. E-mail: athos_bsb@yahoo.com.br. Identificação molecular de um fitoplasma do grupo 16SrIII infectando mandioca no campo.

Phytoplasmas are worldwide distributed causing severe damage in several economically important crops. In Brazil the etiology of several diseases possibly caused by these pathogens still unknown. Cassava plants with typical witches' broom symptoms of phytoplasma infection were collected in Arinos (Minas Gerais State). In order to characterize this phytoplasma, total DNA of sampled cassava plants infected and healthy (negative control) was extracted and used as templates for amplification of 16S rRNA gene by nested-PCR with phytoplasma-universal primers. An expected amplified fragment of approximately 1.2 Kb was cloned into pGEM-Teasy and sequenced. Sequence identity higher than 90% with members of the 16SrIII phytoplasma group (X-disease group) allowed us to classify this cassava phytoplasma as a member of this group. Financial Support: CNPq

56

Physical and biological seed treatments for control of bacterial diseases of carrots and brassicas caused by *Xanthomonas* spp. Roberts, SJ[1]; Amein, T[2]; Forsberg, G[3]; Kromphardt, C[4], Koch, E[4]; Schmitt, A[4]; Werner, S[5]. [1]HDRA, Ryton Organic Gar-dens, Coventry CV8 3LG, UK; [2]Göteborg University, Sweden; [3]Acanova, Sweden; [4]BBA, Germany; [5]Nunhems Zaden (Hild), Germany. E-mail: s.roberts@planthealth.co.uk

As part of an EU-project (Seed Treatments for Organic Vegetable Production, STOVE, QLK5-2002-02239), three physical treatments (hot water, hot air, electron bombardment) and a number of potential biocontrol agents (BCAs) were examined for their efficacy in controlling seedborne *Xanthomonas hortorum* pv. *carotae* and *X. campestris* pv. *campestris*, the causal agents of bacterial blight of carrot and black rot of brassicas, respectively. Seed-borne bacterial pathogens present particular experimental difficulties due to relatively low (but epidemiologically significant) levels of infestation found in seed lots. Physical treatments were optimised to avoid adverse effects on germination of healthy seeds. Potential BCAs were initially screened *in vitro* for inhi-bition/antagonism against the target pathogens and the efficacy of the physical treatments was first evaluated by seed health tests. The best physical treatments and BCAs from the first screening were applied to naturally infested seed and their effects on pathogen transmission (from seed to seedling) were assessed in glasshouse experiments. Finally the most effective methods and combinations were evaluated by seed health tests and in either a field trial (carrot) or glasshouse transmission experiments (bras-sicas). All of the physical treatments gave significant reductions in seed infestation levels and reduced or eliminated transmission from seed to seedling. However, the reduction may not be adequate to avoid damaging disease levels in the field, depending on the initial seed infestation level. Although promising *in vitro*, and initial transmission tests, the selected BCA failed to give sig-nificant reductions in the final trials. More info.: *www.stove-project.net*

57

Transmission and spread of *Xanthomonas campestris* pv. *campestris* in brassica transplants and implications for seed health standards. Roberts, SJ. Plant Health Solutions, 20 Beauchamp Road, Warwick, CV34 5NU, UK. E-mail: s.roberts@planthealth.co.uk

Xanthomonas campestris pv. *campestris* is well known as an important seed-borne pathogen of brassicas. Seed health assays should be designed to have a high probability of detecting unacceptable seed lots; but there has been much dispute over the value of the most sensitive detection assays and the tolerance standards required to achieve satisfactory control. Mathematical models have been developed both for transmission of the pathogen from seed to seedling and subsequent spread in module-raised brassica transplants. The transmission model relates the probability of transmission to the mean dose of bacteria per seed and the spread model relates the proportion of plants contaminated to the distance from the primary infector. Using these models, with different initial parameters, the potential for development of disease epidemics can be explored for negative results obtained by seed health assays with different analytical sensitivities and tolerance standards. Examples of different scenarios will be presented, and suggest that the greatest risk arises when negative test results are obtained from seed lots with a relatively high proportion of infested seeds but low number of bacteria per seed.