MANAGEMENT OF GRAY MOLD (BOTRYTIS CINEREA) IN ROSES

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In Minas Gerais (Brazil) *Botrytis cinerea* is the principal cause of postharvest losses in roses (*Rosa hybrida*) produced in greenhouses. The severe losses led in 1993 to a research program for disease management. In an one-year experiment, *B. cinerea* survived as sclerotia in soil and as mycelium in petals, stems, and leaves. Maximal disease severity on buds occurred at 20°C with a 24- hour wetting period. Under greenhouse conditions, apparently favorable conditions for the gray mould prevailed throughout all flowering season. No difference in disease progress was found between non-sprayed and benomyl and thiophanate-methyl sprayed treatments. For sanitation, the removal of crop debris reduced the number of airborne spores and the disease intensity. The effects of calcium sulfate (CS) spray at preharvest, and pulsing with citric acid, salicylic acid, sucrose, CS, and silver thiosulfate upon the gray mould severity and vase life of rose buds were evaluated. Either spraying or pulsing buds with CS reduced disease severity and increased vase life of buds. *Gliocladium roseum* and *Trichoderma inhamatum* reduced by 90% the sporulation of *B. cinerea* in leaf residues. The effects of environment variables in the survival and establishment of *G. roseum* in rose debris were studied. The fungus survived more than one month under temperatures from 10 to 30°C, and did not require extra leaf watering after its application to become established. Penicialiated conidiophores were produced when humid periods after fungal application were shortenned to less than 24 h. After applying suspensions of *G. roseum* at 10^5 and 10^6 conidia/ml on rose leaves, its sporulation was abundant and the growth of other organisms was fully inhibited. In rose leaf discs, the mycelial growth and sporulation of *B. cinerea* were fully inhibited, independently of when the antagonist was applied. *G. roseum* also parasitized *B. cinerea* and reduced its sporulation when the pathogen was already established in rose leaves. A disease program involving sanitation, application of calcium sulfate, and biocontrol is being developed for greenhouse conditions.

BIOLOGICAL AND ENVIRONMENTAL RISKS INVOLVED IN THE USE OF TRANSGENIC CROPS

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The release of transgenic organisms has evoked an unusual legal process in that laws governing it are prospective on perceived risks rather than retrospective on experienced risks as is the usual case with legislating against problems.
Most countries undertaking transgenic releases have adopted a regulatory structure usually comprising controlled releases to address questions of perceived risks followed by uncontrolled commercial releases. There has been an increasing number of commercial releases with about 11 million hectares of transgenic crops in 1997 and more than 27 million hectares in 1998. Most of these commercial releases have been in industrialised countries with only a small proportion in developing countries.

The controlled releases, together with laboratory experiments, have addressed a range of perceived risks which can put into three groups: risks to humans and domesticated animals, risks to the environment and commercial risks. These perceived risks have to be assessed against the baseline of current and projected farming practices with non-transgenic crops. Few, if any, of these perceived risks have been shown to be real risks which are significantly more important than the non-transgenic situation. The situation with plants transgenically protected against virus infection will be discussed.

In some countries, the discussions on transgenic crop releases has strongly entered the public domain. The debate has raised various ethical issues and ...lects the wish of society to be involved in the uptake of new technologies.

CONTROL OF WOOD-DEGRADING FUNGI IN CANADIAN WOOD SPECIES BY A BIOLOGICAL OR AN INTEGRATED MEANS

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Moulds, stain and decay are serious problems in wood worldwide. The causal fungi lower the grade and value of wood resulting in dramatic losses to the wood industry. Wood-degrading fungi can be controlled by drying and chemical treatment. However, most of chemicals are not universally effective and there are also concerns about environmental toxicity, especially to fish. The introduction of environmentally compatible alternatives for wood protection would be of considerable benefit to the lumber industry. The protection of wood from fungal degradation using biological or integrated means have tremendous potential. A number of biocontrol candidates have been reported worldwide, and *Gliocladium roseum* is one of such fungi. In this study, the bio-activity of *G. roseum* was investigated against different wood-degrading fungi on several major Canadian wood species. Results showed that *G. roseum* provided satisfactory protection of wood from moulds and stain on some species, but failed on some other species. However simultaneous application of *G. roseum* with an alkaline solution on wood produced a noticeable improvement in wood protection against wood-degrading fungi over that provided by *G. roseum* alone. This integrated treatment also significantly reduced wood weight loss from the degradation by the decay fungi.

ECOLOGY AND RISK ASSESSMENT OF GENETICALLY MODIFIED BACULOVIRUSES: FIELD AND LABORATORY STUDIES

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The ongoing development of genetically modified baculoviruses provides the opportunity to extend the use of these more benign methods of pest control and reduce chemical input, particularly in agricultural systems. Baculoviruses with a more rapid speed of kill have already been developed and successfully field-tested, and future targets for genetic modification include the alteration of host range. However, before these 'novel' organisms are released we must investigate whether there are likely to be any negative environmental consequences, particularly on non-target hosts. Over the past five years we have carried out a programme to assess the risks of releasing genetically modified baculoviruses (GMBVs). As a model system we have used the alfalfa looper, *Autographa californica*. nucleopolyhedrovirus (AcNPV) and a recombinant which expresses an insect selective scorpion toxin (AcNPV-ST3). Using an ecological approach which combines both empiricism and host-pathogen theory, we have attempted to develop a general framework for the risk assessment of GMBVs. As a first step in this process, the relative fitness of the wild type and genetically engineered AcNPV have been compared using detailed laboratory assays and small-scale manipulative field experiments. Simple mathematical models highlight four key parameters which can alter the basic reproductive rate of the virus, thereby influencing whether it is likely to establish in non-target populations. These parameters, speed of kill, productivity, transmission and persistence, have been estimated for these two viruses. The results of these experiments and their implications for risk assessment will be discussed, together with the implications of future developments in baculovirus modification.