

### **CLIMEX Parameters**

DV0-3: Temperature Index; DV0 = Limiting low temperature; DV1-DV2 = Optimal range; DV3= Limiting high temperature.

SM0-3: Soil Moisture Index; SM0 = Limiting low moisture; *etc.*

TTCS: Temperature Threshold Cold Stress; the temperature below which cold stress accumulates. THCS: Cold Stress temperature rate; rate parameter for cold stress values.

SMDS: Soil Moisture Dry Stress threshold; dry stress is accumulated if soil moisture levels drop below this value.

HDS: Dry stress rate; rate parameter for dry stress values.

TTHS: Temperature Threshold Heat Stress; heat stress accumulates if temperatures rise above this value. THHS: Temperature rate Heat Stress; rate parameter for heat stress values.

SMWS: Soil Moisture Wet Stress; wet stress is accumulated if moisture levels go above this value. HWS: rate of Wet Stress; rate parameter for wet stress values.

The CLIMEX software package is available from The Software Applications Officer, CRC for Tropical Pest Management, Gehrman Laboratories, University of Queensland, Brisbane, Qld, 4072. Cost: \$295, plus \$10 postage and packing. ph: 07 3365 1851; fax: 07 3365 1855. EMAIL: CLIMEX@ctpm.uq.edu.au

## **SUBMISSION TO THE COMMITTEE OF INQUIRY TO REVIEW AUSTRALIA'S QUARANTINE POLICIES AND PROGRAMS**

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On 13 June 1996 J. Simpson & C. Grgurinovic made a verbal presentation to the Quarantine Committee of

Review. The notes we provided to the Committee follow below. It was our impression that the idea of fungi as weeds was novel to the Committee members. We also thought the Committee had not determined how to make economic assessments of the value of conservation of native flora and fauna or biodiversity in either the short or long term.

### **Submission to Public Hearing of the Australian Quarantine Review Committee in Sydney 13 June 1996.**

We are in broad agreement with the recommendations of the Australian Academy of Science concerning exotic pathogens and invertebrate pests. However, we have concerns about introduction of fungi that are not known pathogens and their potential impacts on the Australian biota.

#### **1. Timber imports.**

Timber can be imported into Australia in a 'green' *i.e.* not dried condition. Sometimes the shipping documents state the timber has been treated with an 'anti-sapstain' but what that treatment was is rarely specified. On arrival in Australia the timber is inspected by AQIS and if insects are detected the timber is fumigated before clearance. However, regardless of the extent of fungus growth, or of sapstain or decay in the timber AQIS do not refuse entry. The occurrence of pitch canker fungus on species of *Pinus* and *Pseudotsuga* on the west coast of North America, a major source of imported timber, makes present quarantine practices a matter of great concern.

#### **2. Bio-remediation agents.**

There is much work being done on use of fungi to breakdown complex organic pollutants of soil. AQIS seems to be permitting entry of such fungi provided they are not known to be pathogens. Fortunately the State Environment Protection Agencies seem to have more responsible approaches and generally are insisting upon use of isolates of fungi from Australia.

#### **3. Fungi for biological control of pathogens.**

AQIS are allowing entry of diverse saprophytes for use as biological control agents *e.g.* species of *Trichoderma* for control of species of *Armillaria* and *Chondrostereum*. *Trichoderma* is a large and difficult genus with more than

120 recognised teleomorphs described overseas. The Australian flora is poorly known. The effect of exotic strains on the Australian mycoflora is not known.

#### 4. Mycorrhizal fungi.

There is considerable interest in introducing mycorrhizal fungi reported to increase plant growth through improved nutrient uptake, or increased pest resistance, or because they produce edible and commercially desirable fruiting bodies. Already we are seeing ingress of these fungi into native communities e.g. *Amanita muscaria*, a symbiont of *Pinus* and *Betula* is now invading *Nothofagus* communities in Victoria and Tasmania. The exotic *Quercus* symbiont *Amanita phalloides* is invading *Eucalyptus* communities in the A.C.T. and Victoria (as it did previously in Africa). In the past two years two people have died in Australia from eating basidiomata of *A. phalloides*.

#### 5. Edible fungi.

*a. Imported fruiting bodies.* There is the risk of introduction of exotic pathogens in needle or leaf fragments, bark, twigs etc. on basidiomata collected from the wild or cultivated on natural substrata. There is also a significant risk of introduction of mycophagous insects, mycophagous nematodes and mycoparasitic fungi. Most of these organisms are cryptic. The Australian fauna is poorly known. One has no confidence current AQIS practices will detect or prevent their entry.

*b. Isolates for cultivation in Australia.* AQIS have permitted introduction to Australia of numerous wood decaying fungi for cultivation for production of edible fruitbodies, e.g. *Agrocybe aegerita*, *Pholiota nameko*, *Hypizygyus* sp. and perhaps species of *Ganoderma*. Decay of wood in service is a major economic problem in Australia. It is possible some of these fungi will establish as significant decay fungi. In natural and in forest communities these fungi may establish with unknown impacts on the native fungal populations, or on the rates of breakdown of woody substrates. Concerns about Greenhouse gases, increased rates of breakdown of fixed carbon dioxide, and Australia's international obligations in this area seem to be ignored by AQIS.

#### 6. Bio-economic risk analysis.

The promises of the Lindsay Committee have not been realised. Once an organism is established, and that is decided by AQIS, it becomes a State or Territory problem. Contingency planning is agricultural in focus. Aspects effecting native biota are largely ignored.

#### 7. Ministerial responsibility for Plant Quarantine.

We would respectfully ask that the Review Committee consider if it is still appropriate for plant quarantine to be a Department of Primary Industries or Department of Trade responsibility. We think it may be more appropriate for plant quarantine to be a responsibility of the Department of the Environment.

Yours sincerely,

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### TAXONOMY IN CRISIS

On 18 October 1995 the ABRS Advisory Committee hosted a Workshop in Canberra (see 15 (1): 15-16). Copies of the report *Taxonomy in Crisis? A Report on a National Workshop in Canberra 18 October 1995* are available from The Director, ABRS, GPO Box 636, Canberra, ACT 2601.