INTERNATIONAL CONFERENCE ON ALTERNATIVES TO METHYL BROMIDE
LISBON, 27-30 SEPTEMBER 2004

THURSDAY 30 SEPTEMBER: SUMMARIES OF ALTERNATIVES IN USE
PLENARY 3, 15:00 – 18:00 hours

ALTERNATIVE IN USE	TARGET OR KEY PESTS --- INSECTS, MITES, FUNGI, NEMATODES, WEEDS, OTHER	EXAMPLES OF COUNTRIES WHERE THIS ALTERNATIVE IS USED
SESSION 1B: Melon, watermelon, cucumber		
Grafting	*Fusarium oxysporum melonis*, *Monosporascus cannonballus*, Melon necroyic spot virus (MNSV), *Meloidgyne* sp. – melon *F. oxysporum cucumerinum*, *Phomopsis sclerotiodes*, *Meloidgyne* sp. – cucumber *F. oxysporum niveum*, *Monosporascus cannonballus*, Melon necroyic spot virus (MNSV), *Meloidgyne* sp. – watermelon	Spain, France, Italy, Greece, Israel, Jordan, Morocco
SESSION 1B: Melon, cucumber, zucchini (courgette)		
Physical and biological techniques and other alternative products	Main soil pathogens	France
SESSION 1B: Melon, watermelon, zucchini		
Organic and inorganic substrates	Soil pathogens	Sardinia
SESSION 1B: Melon, watermelon, cucumber		
Grafting 1,3D + PIC	Soil borne disease + weeds	Central America, Med region and Romania
ALTERNATIVES FAIR (SOIL TREATMENTS)		

Strawberry		
Agrocelhone (1,3 - dichloropropene+chloropicin)	Weeds, nematodes, bacteria, insects and fungi	Spain
All crops		
Cultivit (heat desinfestation equipment)	nematodes	Israel
Tomato		
SEP-100 (sodium azide pesticide)	Weeds, nematodes, bacteria, insects and fungi	US
Tomato, cotton		
Agri-Terra (potassium phosphate)	Nematodes and some soil pathogens	US, Asia, Europe
Crop: Melons, strawberry, tomato, pepper, olive trees		
Dazitol (hot pepper extract and cabbage oil extracts pesticide)	nematodes	US, Asia, Europe
Crop: Cut-flowers		
Agrocelhone (1,3 - dichloropropene+chloropicin)	Weeds, nematodes, bacteria, insects and fungi	Spain
Crop: Ornamentals and horticulture		
Móvil Vap (steam equipment)	Nematodes, weeds and fungi	Argentina
ALTERNATIVES FAIR (NON-QPS)		
Flour mills (rice, feed)	Beetles	**I. Phosphine** 1. Solid (180 countries) 2. Cylinder (USA, Australia, Canada, Germany) 3. Pre-packaged (120 countries)
Wood	Beetles, weevils	
Dried fruit and nuts	Moths	

Food processing facilities Grain (wheat, rice, maize, sorghum)	Stored Product Insects (*Tribolium confusum*, *Sitophilus oryzae*, *Plodia interpunctella*, *Ephestia kuhniella*) and bird control	**II. Sulfuryl fluoride as Profume®** (USA, Switzerland, UK, Italy, Mauritius) **III CO_2 (global)** Combined with heat, pressure, and phosphine at low levels. **IV. IPM (global)** Better hygiene Better in-bound fumigation Bird control – exclusion, baits, screens and trapping
Tobacco	Specific pests that infest tobacco	
SESSION 3B: STRUCTURES, COMMODITIES AND ARTEFACTS		
Improved Grain Storage Fumigation (Key to minimizing infestations in the mill) ■ **Aluminium/magnesium phosphide** ■ **ECO2 Fume** (Cylinderized phosphine)	Rice weevil, Granary weevil, Lesser Grain Borer, etc	**ECO2Fume** currently registered USA, Canada, France, Australia, Trinidad and Tobago – pending in additional EU countries, Asia and Africa. Currently being tested in Denmark (expect registration in 2004) World wide use of other formulations of phosphine
Sulfuryl fluoride (ProFume) • Cereal grain storage and milling • Food processing facilities • Dried fruit and tree nuts	All life stages of SPIP and rodents	Currently registered in USA, UK, Italy and Switzerland – Pending registrations in France, Germany and Canada. Over 50 successful commercial mill fumigations in US since registration
Carbon dioxide (CO2) niche product for structural fumigation/organic technique for fumigating commodities and artefacts	SPIP and rodents	USA
Combination Fumigation Method (CFM) using cylinderized phosphine, heat	SPIP	USA and various European countries ECO2Fume+Heat+CO2 tested successfully in

and CO2 for mills and food processing facilities		Danish flour mill in 2002

Integrated Pest Management (IPM)
• Inspection/Monitoring (perimeter trapping and indoor pheromone monitoring)
• Rodent/Bird Control
• Residual Insecticide Applications
• Vacuuming
Integrated Stored Product Protection
• **PREVENTION** of stored product pests through structural design, hygiene, etc.
• **Detection** as soon as possible (traps and visual inspection)
• **Control** by physical, biological, biotechnical and chemical means
  ○ **Chemical** (PH3,CO2,Nitrogen, diatomaceous earth
  ○ **Biological** (parasitoids or predators)
	Insect pests, rodents and birds
	
	All SPIP in mills and food processing facilities
		Used to some degree world wide.
		
		Several cases around the world where successful pest control can be done without use of chemical treatments. Denmark example given.
		
		Germany and many other countries

Sanitation – A Legal Requirement • Most important management tool	Insect pests, rodents and birds	Specific case examples provided for Greece but used world wide in varying degrees

for **avoiding** insect pests in food processing facilities o Audits/Inspections Key o Use of IPM tools/methods o Training is important		
Sanitation + IPM + Heat • Use in bakery, milling and other food processing and storage facilities • Offers a non-chemical alternative with high level of public and regulatory acceptance • Requires a progressive team approach – General Manager, QA, Pest Management, Production etc. • Best suited for small/modern mills. Larger, older mills can be difficult to heat.	SPIP in bakery, milling and food processing facilities	Adaptable to wide range of climates, pests and facilities. IPM programs in place from tropics (Hawaii) to cool temperate areas of Scandinavia. Used for many years all over the world as a MB alternative. Over 100 heat treatments have been carried out in mills in Europe.
Controlled Atmosphere (CA) • Low oxygen environment • **Airtight climate rooms** to alter temperature, Oxygen, CO2 and humidity • 3-10 day treatments	Control of all stages of insects, rats, mice in food, artefacts, silos and food processing facilities	Netherlands, Belgium, Uganda
Controlled Atmosphere (CA) For Rice	Controls all stages of weevil pests in rice in ship hold. Rice weevil, flour weevil,	Netherlands

• < 2% Oxygen + Nitrogen + CO2 ○ Effective at 15 degrees C or higher • Applied to rice prior to entering facility **Heated Controlled Atmosphere** • Combines heat and low oxygen • 24 hour treatments for quarantine and pre shipments • Treatment of full shipping containers	flour moths Quarantine pests in containers, general cargo	Netherlands Netherlands

Modified Atmosphere (MA)
• Hermetic Sealing
• Low Pressure/Vacuum
  ○ Use of Vacuum Hermetic Fumigation (V-HF)
  ○ 5-7 day exposure
	Control of all stages of major SPIP in cereal grains, pulses, oil seeds, nuts, cocoa, coffee and soybeans	Tested on cocoa in USA and Israel and Ivory Coast
		
		Commercialized in Israel

Hot Water + Steam for Chestnuts • Pass thru heated water/steam heated to 48-50 degrees centigrade, cooled then dried • Export Chestnut Market in Portugal	Controls the two major insect pests in Chestnuts, *Cydia splendana and Balaninus elephas*	Commercial use in Portugal since 1992, treatment currently accepted by Canada and Brazil. Japanese currently looking at methyl iodide as the most promising treatment for Japanese chestnuts.
Industry Training is Critical • Most important obstacle to a broad, quick, smooth		Mandatory training courses for fumigators (such as in Germany) can be a means of educating the industry on MB alternatives including pest prevention and monitoring, food

implementation of MB alternatives is one of **ATTITUDE** toward suitability and cost of alternatives compared to MB
 	
• Training needed to overcome 2 major attitudes:
  ○ "MB is the best treatment"
  ○ "Alternatives are too expensive"
		and feed security and hygiene