

**DIRECTORY OF
MICROBIAL CONTROL
PRODUCTS AND
SERVICES**

**SOCIETY FOR INVERTEBRATE PATHOLOGY
DIVISION ON MICROBIAL CONTROL**

DIRECTORY OF MICROBIAL CONTROL PRODUCTS AND SERVICES

Compiled and edited by
Paresh A. Shah
Institute of Microbiology
Swiss Federal Institute of Technology
ETH Zentrum
CH-8092 Zurich, Switzerland
and
Mark S. Goettel
Agriculture and Agri-Food Canada Research Centre
Lethbridge, Alberta T1J 4B1

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Society for Invertebrate Pathology

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This Directory can also be viewed at the Society's website at "www.sipweb.org"

CONTENTS

	<u>Page</u>
Preface.....	v
The Questionnaire	vii
Bacteria.....	1
Fungi	6
Nematodes	11
Protozoa.....	14
Viruses	15
Transgenic Plants.....	18
Contract Services	19
Index of Pathogens.....	20
Index of Target Hosts	21
Index of Crops and Habitats.....	23
Index of Companies and Addresses.....	25
Index of Trade Names	30

PREFACE

In December 1991, the Division on Microbial Control published the Directory of Industries Involved in the Development of Microbial Control Products. Two Supplements were published in the Society for Invertebrate Pathology Newsletter as Supplement 1 in January 1993 and Supplement 2, in February 1994. Since there have been many changes since then, the Division decided in 1996 to publish a whole new directory.

The present Directory was compiled as a result of questionnaires sent out to industries and published in the November and June, 1997 SIP Newsletters. The cooperation of all those who returned questionnaires have made this Directory possible. Some entries were extracted from published literature. Although attempts were made to make this Directory as comprehensive as possible, we are aware that there are still many companies and products that are not listed. For instance, it has been brought to our attention that the information contained in the following manual should be consulted for additional products and services: Copping, L.C. 1998, The Biopesticide Manual. British Crop Protection Council, Earham, Co 380 pp. in press. ISBN 1 901396 26. 6. The Division on Microbial Control plans to upgrade and publish new versions of the Directory as necessary. Your assistance in providing updated information will be appreciated. Please photocopy and fill in the questionnaire on the following page, one page for each pathogen.

In this Directory, we have arranged the products by organism. Under each organism, we have further ordered each product by company. The information contained in this Directory is based upon sources believed by us to be reliable but is not guaranteed as to accuracy or completeness.

We thank all those who made this Directory possible. Special thanks to Kendra Grams of the Lethbridge Research Centre for her help in compilation of this document.

Paresh A. Shah
Mark S. Goettel
January, 1999

**SOCIETY FOR INVERTEBRATE PATHOLOGY,
MICROBIAL CONTROL DIVISION**

**Questionnaire for
Directory of Microbial Control Products and Services, Second Edition**

This directory will be made available to the Society membership and any other interested parties. In order for this venture to be a success, we need feedback from all industry involved in the area of invertebrate microbial control or use of pathogen genes in transgenic organisms intended for invertebrate pest control. If you are not involved in industry, please forward this questionnaire to someone in industry who may not otherwise receive it. If replying by e-mail, simply include your response following the questionnaire question number. **Please fill out a separate page for each pathogen or pathogen group.**

- 1) Pathogen developed or being developed or area of research, i.e., delivery systems, formulation, safety testing etc. (if more than one pathogen or area of research, please complete separate form for each): _____

- 2) Formulations: _____
- 3) Trade name: _____
- 4) Target host(s) (can be broad): _____

- 5) Crop or Habitat: _____

- 6) Company name: _____
Company address: _____
Telephone no.: _____ Facsimile no.: _____
E-mail: _____
- 7) Contact person: _____
- 8) Registration status: _____
- 9) Which countries? _____
- 10) Availability of experimental formulations (are formulations available for researchers to test?): _____

Please return completed form(s) to:
Mark Goettel
Agriculture and Agri-Food Canada
Lethbridge Research Centre
P.O. Box 3000 Lethbridge, Alberta, Canada T1J 4B1
Tel. (403) 317-2264; Fax. (403) 382-3156; E-mail: goettel@em.agr.ca

BACTERIA

Pathogen: *Bacillus thuringiensis*
Formulations: Wettable powder
Trade name: Bt 8010, Rijin
Target host: Lepidoptera including *Plutella xylostella*, *Pieris rapae*, *Helicoverpa zea*, *Dendrolimus punctatus* and *Ostrinia nubilalis*
Crop/habitat: Vegetables, cotton, fruit trees, rice, maize, forestry and ornamentals
Company: Scientific & Technological Developing
Contact: Mr. Guo Yaorong, Dr. Xiang Guan; gx@e3000.fjau.edu.cn
Registration status: Yes
Which countries: P.R. China, Malaysia
Availability: Yes

Pathogen: *Bacillus thuringiensis*
Formulations: Granular feeding baits
Trade name: Bitayon[®]
Target host: *Batrachedra amydraula* (lesser datepalm moth), other lepidopteran pests
Crop/habitat: Datepalm, vegetable and field crops
Company: Jewin-Joffe Industry Limited
Contact: Dr. Amos Navon; vnavon@volcani.agr.gov.il
Registration status: Yes (datepalm since 1997)
Which countries: Israel
Availability: Yes

Pathogen: *Bacillus thuringiensis*
Trade name: Delfin[®], THURICIDE
Target host: Lepidoptera
Crop/habitat: Vegetables, ornamentals, orchards, tea, turf
Company: SDS Biotech K.K.
Contact: Mr. Masaji Kinoshita, Dr. Satoshi Yamanaka
Registration status: Yes
Which countries: Japan, South-East Asia
Availability: Yes

Pathogen: *Bacillus thuringiensis* strain YBt-1520
Formulations: Wettable powder
Trade name: Mianfeng pesticide
Target host: Lepidoptera especially *Helicoverpa armigera* and *Plutella xylostella*
Crop/habitat: Cotton, vegetable, maize, fruit
Company: Huazhong Agricultural University
Contact: Professor Yu Ziniu; YZ41@public.wh.hb.cn
Registration status: Yes (Chinese patent no. 95106749.4)
Which countries: P. R. China
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *aizawai*
Formulations: Water dispersible granule
Trade name: XenTari®
Target host: Various Lepidoptera
Crop/habitat: Field crops, vegetables, greenhouse, orchard fruits and nuts, ornamentals
Company: Abbott Laboratories
Contact: Jim Haeger
Registration status: Yes
Which countries: Worldwide (some restrictions in California)
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *aizawai* strain GC91 (conjugant)
Formulation: Wettable granules
Trade name: Agree®, Design®, Turex®
Target host: Lepidoptera, resistant *Plutella xylostella*
Crop/habitat: Vegetables
Company: Thermo Trilog Corporation
Contact: C.-Y. Chen; cychen@thermotrilog.com
Registration status: Yes
Which countries: Worldwide
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *chinesensis* strain CT-43 (no flagellae)
Formulations: Wettable powder
Trade name: Shuangdu preparation
Target host: Wide insecticidal spectrum: Lepidoptera, Diptera and Coleoptera, especially *Helicoverpa armigera*, *Dendrolimus* spp., *Ostrinia nubilalis*, Limacodidae, *Cryptothelea minuscula*, Museidae, *Aprion germani*
Crop/habitat: Forest, gardens, cotton, maize.
Company: Huazhong Agricultural University
Contact: Professor Yu Ziniu; YZ41@public.wh.hb.cn
Registration status: No (passed safety testing)
Which countries: P. R. China
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *galleriae*, wild type strain
Formulations: Liquid concentrate
Trade name: SPICTURIN
Target host: *Plutella xylostella*
Crop/habitat: Cabbages, cauliflowers
Company: Tuticorin Alkali Chemicals and Fertilisers limited
Contact: Dr. T. Chellathurai; tacmsd@giasmd01.vsnl.net.in
Registration status: Yes
Which countries: India
Availability: Commercially available

Pathogen: *Bacillus thuringiensis* var. *israelensis*
Formulations: Liquid, granules, aqueous suspension, pellets
Trade name: Gnatrol[®]; VectoBac[®] G, 12AS; Bactimos[®]
Target host: Fungus gnats, mosquitoes, blackflies
Crop/habitat: Greenhouse ornamentals and vegetables, ditches, swamps, ponds etc.
Company: Abbott Laboratories
Contact: Jim Haeger
Registration status: Yes
Which countries: Worldwide
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *israelensis* strain 187
Trade name: JieJueLing preparation
Target host: Diptera, especially to *Culex*, *Anopheles*, *Aedes*
Crop/habitat: Rice fields, sewage and drainage ditches, ponds
Company: Huazhong Agricultural University
Contact: Professor Yu Ziniu; YZ41@public.wh.hb.cn
Registration status: No
Which countries: P. R. China
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *israelensis*
Formulations: Liquid concentrate
Trade name: TEKNAR[®], TEKNAR[®] HPD
Target host: Mosquitoes, blackflies
Crop/habitat: Ditches, swamps, lakes, ponds, rivers
Company: Thermo Trilog Corporation
Contact: C.-Y. Chen; cychen@thermotrilog.com
Registration status: Yes
Which Countries: Worldwide
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *israelensis* strain 187 and *Bacillus thuringiensis* strain cs-8.
Trade name: MieJueLing preparation
Target host: Diptera, especially *Culex*, *Anopheles* and *Aedes* spp.
Crop/habitat: Rice fields, sewage and drainage ditches, ponds
Company: Huazhong Agricultural University
Contact: Professor Yu Ziniu; YZ41@public.wh.hb.cn
Registration status: Yes
Which countries: P. R. China
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *kurstaki*
Formulations: Dry flowable, emulsifiable suspension, granule, sand granule, flowable concentrate, wettable powder
Trade name: Dipel® DF, ES, 4L, 10G, SG Plus; Biobit® XL, HP; Foray® 48B, 48F, 76B
Target host: Various Lepidoptera
Crop/habitat: Field crops (e.g. cotton, cereals, tobacco), vegetables, greenhouse, orchard fruits and nuts, ornamentals, forestry, stored commodities
Company: Abbott Laboratories
Contact: Jim Haeger
Registration status: Yes
Which countries: North America
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *kurstaki*
Formulation: Wettable powder, wettable granules
Trade name: THURICIDE
Target host: Lepidoptera
Crop/habitat: Vegetables, forestry
Company: Thermo Trilogy Corporation
Contact: C.-Y. Chen; cychen@thermotrilogy.com
Registration status: Yes
Which countries: Worldwide
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *kurstaki* strain SAH
Formulation: Wettable granules
Trade name: Javelin®, Delfin®, 32 LV
Target host: Lepidoptera
Crop/habitat: Field crops, vegetables, fruit, nuts, forestry
Company: Thermo Trilogy Corporation
Contact: C.-Y. Chen; cychen@thermotrilogy.com
Registration status: Yes
Which countries: Worldwide
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *kurstaki* strain SA12
Formulation: Wettable granules
Trade name: CoStar®, 48 LV
Target host: Lepidoptera
Crop/habitat: Field crops, fruit, nuts, forestry
Company: Thermo Trilogy Corporation
Contact: C.-Y. Chen; cychen@thermotrilogy.com
Registration status: Yes
Which countries: Worldwide
Availability: Yes

Pathogen: *Bacillus thuringiensis* var. *tenebrionis*
Formulations: Flowable concentrate
Trade name: Novodor[®]
Target host: Colorado Potato Beetle, Elm Bark Beetle
Crop/habitat: Potatoes, tomatoes and eggplant against CPB, shade trees and ornamentals against EBB
Company: Abbott Laboratories
Contact: Jim Haeger
Registration status: Yes
Which countries: North America
Availability: Yes

Pathogen: *Bacillus sphaericus*
Formulations: Granules
Trade name: VectoLex[®]
Target host: Mosquitoes
Crop/habitat: Ditches, swamps, ponds, salt marshes, ricefields
Company: Abbott Laboratories
Contact: Jim Haeger
Registration status: Yes
Which countries: North America
Availability: Yes

Pathogen: *Bacillus sphaericus* 1593 M
Formulations: Liquid concentrate
Trade name: SPICBIOMOSS
Target host: *Anopheles* and *Culex* spp.
Crop/habitat: Drainage ditches, ponds, etc.
Company: Tuticorin Alkali Chemicals and Fertilisers limited
Contact: Dr. T. Chellathurai; tacmsd@giasmd01.vsnl.net.in
Registration status: Yes
Which countries: India
Availability: Commercially available

Pathogen: *Bacillus thuringiensis* var. *kurstaki* EG7673
Trade name: Raven
Target host: Coleopteran larvae
Crop/habitat: Potatoes, tomatoes, eggplant
Company: Ecogen Inc.
Contact: Tim Johnson; tbjohnso@voicenet.com
Registration status: Yes
Which countries: U.S.
Availability: Yes - oil flowable

Pathogen: *Bacillus thuringiensis* var. *kurstaki* ED7841
Trade name: Crymax
Target host: Lepidopteran pests of vegetables and horticultural crops
Crop/habitat: Vegetable, horticultural ornamental crops
Company: Ecogen Inc.
Contact: Tim Johnson; tjohnso@voicenet.com
Registration status: Yes
Which countries: U.S., Mexico, Malaysia
Availability: Yes in WDG and WP formulations

Pathogen: *Bacillus thuringiensis* var. *kurstaki* EG7826
Trade name: Lepinox
Target host: Lepidoptera - especially armyworms
Crop/habitat: Turf, hay, row crops, sweet corn
Company: Ecogen Inc.
Contact: Tim Johnson; tjohnso@voicenet.com
Registration status: Yes
Which countries: U.S.
Availability: Yes in WDG and G formulations

FUNGI

Pathogen: *Beauveria bassiana*
Trade name: AGO BIOCONTROL BASSIANA 50
Target host: Coleoptera, Homoptera, Lepidoptera, Diptera
Crop/habitat: Coffee, flowers, vegetables and other crops
Company: Ago Biocontrol
Contact: John Jairo Villar
Registration status: Yes
Which countries: Colombia
Availability: Yes

Pathogen: *Beauveria bassiana* (all aspects of R&D for commercialization)
Trade name: Mycotrol WP and ES; BotaniGard ES; CornGard ES and G
Target host: Homoptera/Heteroptera, thrips, certain Coleoptera, Lepidoptera and Orthoptera
Crop/habitat: Mycotrol for field and vegetable crops; BotaniGard for indoor/outdoor nursery, greenhouse and landscape ornamentals and vegetables; CornGard for corn (maize)
Company: Mycotech Corporation
Contact: Dr. Clifford Bradley, Dr. Stefan T. Jaronski; mycotech@in-tch.com or mycotech@montana.com
Registration status: Yes
Which countries: Currently USA, Mexico and several others from 1998
Availability: Yes

Pathogen: *Beauveria bassiana*
Formulations: Clay granules
Trade name: Ostrinil
Target host: Corn earworm, *Ostinia nubilalis*
Crop/habitat: Corn
Company: Natural Plant Protection (NPP)
Registration status: Yes
Which countries: France
Availability: Yes

Pathogen: *Beauveria brongniartii*
Trade name: AGO BIOCONTROL BEAUVERIA 50
Target host: Coleoptera, Homoptera, Lepidoptera, Diptera
Crop/habitat: Flowers, vegetables, potatoes, oil palms and other crops
Company: Ago Biocontrol
Contact: John Jairo Villar
Registration status: Yes
Which countries: Colombia
Availability: Yes

Pathogen: *Beauveria brongniartii*
Trade name: Engerlingspilz
Target host: *Melolontha melolontha*
Crop/habitat: Pastures, grassland
Company: Andermatt Biocontrol AG
Contact: Dr. Martin Andermatt
Registration status: Yes
Which countries: Switzerland
Availability: Yes

Pathogen: *Beauveria* and *Metarhizium* spp.
Trade name: *Beauveria* Schweizer[®], *Metarhizium* Schweizer[®]
Target host: Insects
Crop/habitat: Turf/grassland, fruit growing, viticulture and horticulture
Company: Eric Schweizer Seeds Ltd.
Contact: Dr. Horst Matzke
Registration status: Yes
Which countries: Switzerland
Availability: Yes

Pathogen: *Chondrostereum purpureum*
Trade name: BIOCHON
Target host: *Prunus serotina* (black cherry)
Crop/habitat: Forestry
Company: Koppert Biological Systems B.V.
Contact: Drs. W.J. Ravensberg; W.Ravensberg@Koppert.nl
Registration status: No registration required
Which countries: Worldwide
Availability: Yes

Pathogen: *Gliocladium virens* strain GL-21
Trade name: SoilGard™ biological fungicide
Target host: Root-rot and damping-off pathogens (*Pythium*, *Rhizoctonia*, *Sclerotinia*, *Sclerotium*, and *Fusarium* spp.)
Crop/habitat: Ornamentals, vegetables, turf, and other crops
Company: Thermo Trilog Corporation
Contact: Dr. Jacob Eyal; jeyal@thermotrilog.com
Registration status: Yes
Which countries: USA - 1996 for greenhouse use, 1997 for outdoor use.
Availability: Experimental formulations available only by special arrangement.

Pathogen: *Lagenidium giganteum*
Trade name: LAGINEX™
Target host: All mosquito larvae
Crop/habitat: Rice, wetlands, ponds, lakes, vernal pools
Company: AgraQuest, Inc.
Contact: Dr. Pamela G. Marrone; AgraQuest@aol.com
Registration status: Yes
Which countries: USA
Availability: Some formulations available for testing

Pathogen: *Metarhizium anisopliae*
Trade name: AGO BIOCONTROL METARHIZIUM 50
Target host: Lepidoptera, Coleoptera, Homoptera, Orthoptera
Crop/habitat: Flowers, vegetables, potatoes, grassland and other crops
Company: Ago Biocontrol
Contact: John Jairo Villar
Registration status: Yes
Which countries: Colombia
Availability: Yes

Pathogen: *Metarhizium anisopliae* isolate F-001
Formulations: Granules
Trade name: BioGreen™ Granules
Target host: *Adoryphouse couloni* (red-headed cockchafer)
Crop/habitat: Pasture and turf
Company: Bio-Care Technology Pty. Limited
Contact: Mr. Gray K. Bullard; biocare@ozemail.com.au
Registration status: Yes
Which countries: Australia (specifically Tasmania, Victoria and South Australia only)
Availability: Yes (and other isolates of *M. anisopliae*)

Pathogen: *Metarhizium anisopliae*
Trade name: BIO 1020
Target host: Vine weevil
Company: Bayer AG
Registration status: Yes
Which countries: Germany
Availability: Not at present

Pathogen: *Metarhizium anisopliae* var. *acridum* isolate IMI 330189
Formulation: OF, SU
Trade name: Green Muscle
Target host: *Locustana pardalina* and other locusts and grasshoppers
Crop/habitat: Conservation areas, rangeland
Company: Biological Control Products SA PTY
Contact: Di Neethling; bcp-dn@dbnpop01.iafrica.com
Registration status: Nov. 98
Which countries: South Africa
Availability: Yes (samples may also be obtained from Lubilosa-IITA, 08 bp 0932, Cotonou, Benin; j.langewald@cgiar.org)

Pathogen: *Myrothecium verrucaria*
Formulations: Emulsifiable suspension, granule
Trade name: DiTera[®] ES, WDG, G
Target host: Various plant parasitic nematodes
Crop/habitat: Annual and perennial crops (e.g. ornamentals, cabbage, citrus, turf)
Company: Abbott Laboratories
Contact: Jim Haeger
Registration status: Yes
Which countries: Worldwide
Availability: Yes

Pathogen: *Nomuraea rileyi*
Trade name: AGO BIOCONTROL NOMURAEA 50
Target host: Lepidoptera
Crop/habitat: Flowers, vegetables, potatoes, oil palms and other crops
Company: Ago Biocontrol
Contact: John Jairo Villar
Registration status: Yes
Which countries: Colombia
Availability: Yes

Pathogen: *Paecilomyces fumosoroseus*
Trade name: AGO BIOCONTROL PAECILOMYCES 50
Target host: Coleoptera, nematodes
Crop/habitat: Flowers, vegetables, fruits and other crops
Company: Ago Biocontrol
Contact: John Jairo Villar
Registration status: Yes
Which countries: Colombia
Availability: Yes

Pathogen: *Paecilomyces fumosoroseus* strain Apopka 97
Trade name: PFR-97™ biological insecticide
Target host: Greenhouse whitefly (*Trialeuroides vaporariorum*), sweetpotato whitefly (*Bemisia tabaci*), aphids, thrips, spidermites
Crop/habitat: Ornamentals, vegetables
Company: Thermo Trilogy Corporation
Contact: Dr. Jacob Eyal; jeyal@thermotrilogy.com
Registration status: Yes
Which countries: Registered in the European Union 1997 (first microbial pesticide to pass new unified registration requirements). USA
Availability: Experimental formulations available only by special arrangement.

Pathogen: *Trichoderma harzianum*
Trade name: AGO BIOCONTROL TRICHODERMA 50
Target host: *Fusarium*, *Rhizoctonia*, *Alternaria*, *Rosellinia*, *Botrytis*, *Sclerotium* and *Phytophthora* spp.
Crop/habitat: Flowers, vegetables, fruits and other crops
Company: Ago Biocontrol
Contact: John Jairo Villar
Registration status: Yes
Which countries: Colombia
Availability: Yes

Pathogen: *Verticillium lecanii*
Trade name: AGO BIOCONTROL VERTICILLIUM 50
Target host: Homoptera, Diptera
Crop/habitat: Flowers, vegetables and other crops
Company: Ago Biocontrol
Contact: John Jairo Villar
Registration status: Yes
Which countries: Colombia
Availability: Yes

Pathogen: *Verticillium lecanii*
Trade name: MYCOTAL
Target host: Whiteflies, some activity against thrips
Crop/habitat: Protected crops (cucumber, tomato, sweet pepper, eggplant, lettuce, beans, ornamentals), hardy nursery stock
Company: Koppert Biological Systems B.V.
Contact: Drs. W.J. Ravensberg; W.Ravensberg@Koppert.nl
Registration status: Yes
Which countries: Netherlands, U.K., Switzerland, Finland, Norway and pending in Denmark.
Availability: Yes

Pathogen: *Verticillium lecanii*
Trade name: VERTALEC
Target host: Aphids
Crop/habitat: Protected crops (cucumber, tomato, sweet pepper, eggplant, lettuce, beans, ornamentals)
Company: Koppert Biological Systems B.V.
Contact: Drs. W.J. Ravensberg; W.Ravensberg@Koppert.nl
Registration status: Yes
Which countries: U.K., Switzerland, Norway and pending in Denmark and Finland
Availability: Yes

NEMATODES

Pathogen: *Heterorhabditis bacteriophora*
Trade name: Cruiser
Target host: Soil dwelling Coleopteran and Lepidopteran larvae
Crop/habitat: Turf, nursery and ornamental crops
Company: Ecogen Inc.
Contact: Tim Johnson; tbjohnso@voicenet.com
Registration status: Exempt
Which countries: U.S.
Availability: Product available to researchers in WP formulation

Pathogen: *Heterorhabditis bacteriophora*
Trade name: Nema-top, nema-green
Target host: Black Vine weevil, sciarids, grubs
Crop/habitat: Home/garden, lawns, strawberries, ornamentals, tree nurseries
Company: e-nema GmbH
Contact: Dr. Arne Peters; e-nema.biotec@t-online.de
Registration status: Not necessary
Availability: Yes

Pathogen: *Heterorhabditis megidis*
Trade name: Dickmaulrüsslernematoden
Target host: Black Vine weevil, *Otiorhynchus sulcatus*
Crop/habitat: Horticulture
Company: Andermatt Biocontrol AG
Contact: Dr. Martin Andermatt
Registration status: Yes
Which countries: Switzerland, Austria
Availability: Yes

Pathogen: *Heterorhabditis megidis*
Trade name: LARVANEM
Target host: Curculionids e.g. vine weevil *Otiorhynchus sulcatus*
Crop/habitat: Mainly ornamental crops, hardy nursery stock and herbs
Company: Koppert Biological Systems B.V.
Contact: Drs. W.J. Ravensberg; W.Ravensberg@Koppert.nl
Registration status: Registered if necessary
Which countries: Canada, South Africa, USA. No registration required in European countries except for Austria, Switzerland and Sweden (where registration has been obtained)

Availability: Yes

Pathogen: Steinernematid nematodes
Trade name: Biosafe
Target host: Coleoptera, Lepidoptera
Crop/habitat: Turf
Company: SDS Biotech K.K.
Contact: Mr. Masaji Kinoshita, Dr. Satoshi Yamanaka
Registration status: Yes
Which countries: Japan, South-East Asia
Availability: Yes

Pathogen: *Steinernema* and *Heterorhabditis* spp.
Trade name: SCANMASK, ECOMASK, HETEROMASK
Target host: Soil and cryptic insects
Crop/habitat: Mostly high value horticultural crops or lawn and garden use
Company: BioLogic Company
Contact: Albert Pye; pyealber@epix.net
Registration status: No registration required in USA
Which countries: USA
Availability: Yes

Pathogen: *Steinernema carpocapsae*
Trade name: BioVector[®], Vector[®] TL, Savior[®], and BioSafe[®] biological insecticides
Target host: Cutworms, armyworms, billbugs, root weevils, vine weevils, stem borers, fleas, fungus gnats, webworms
Crop/habitat: Vegetables, small fruits, turf, ornamentals
Company: Thermo Trilogy Corporation
Contact: Dr. Michael Dimock; mdimock@thermotrilogy.com
Registration status: No
Which countries: Exempt from registration by US EPA, registered in various States within USA
Availability: Experimental samples available by special arrangement or purchased from commercial distributors

Pathogen: *Steinernema carpocapsae*
Trade name: None
Target host: Mole crickets
Crop/habitat: Vegetables
Company: Andermatt Biocontrol AG
Contact: Dr. Martin Andermatt
Registration status: Not necessary
Availability: Yes

Pathogen: *Steinernema feltiae*
Trade name: TRAUNEN
Target host: Sciarids
Crop/habitat: Ornamentals
Company: Andermatt Biocontrol AG
Contact: Dr. Martin Andermatt
Registration status: Yes
Which countries: Switzerland, Austria
Availability: Yes

Pathogen: *Steinernema feltiae*
Trade name: nema-plus
Target host: Sciarid flies
Crop/habitat: Mushroom cultures
Company: e-nema GmbH
Contact: Dr. Arne Peters; e-nema.biotec@t-online.de
Registration status: Not necessary
Availability: Yes

Pathogen: *Steinernema feltiae*
Trade name: ENTONEM, SCIA-RID
Target host: Sciarid flies
Crop/habitat: Protected crops (ornamentals, herbs, vegetables, mushrooms, seedling cultivation)
Company: Koppert Biological Systems B.V.
Contact: Drs. W.J. Ravensberg; W.Ravensberg@Koppert.nl
Registration status: Registered if necessary
Which countries: Canada, Mexico, South Africa, USA. No registration required in European countries except for Austria, Switzerland and Sweden (where registration has been obtained)
Availability: Yes

Pathogen: *Steinernema feltiae*
Trade name: Magnet[®] and X-Gnat[®] biological insecticides
Target host: Mushroom flies, fungus gnats
Crop/habitat: Mushrooms, greenhouse crop
Company: Thermo Trilogy Corporation
Contact: Dr. Michael Dimock; mdimock@thermotrilogy.com
Registration status: No
Which countries: Exempt from registration by US EPA, registered in various States within USA
Availability: Experimental samples available by special arrangement or purchased from commercial distributors

Pathogen: *Steinernema riobrave* (=riobravis)
Trade name: BioVector[®] 355, Vector[®] MC, and Devour[®] biological insecticides
Target host: Citrus root weevil complex (*Diaprepes abbreviatus*, *Pachneus* spp., others), mole crickets (*Scapteriscus* spp.), plant-parasitic nematodes (*Belonolaimus*, *Meloidogyne*, and *Criconemella* spp.)
Crop/habitat: Citrus, turf
Company: Thermo Trilogy Corporation
Contact: Dr. Michael Dimock; mdimock@thermotrilogy.com
Registration status: No
Which countries: Exempt from registration by US EPA, registered in various States within USA
Availability: Experimental samples available by special arrangement or purchased from commercial distributors

Pathogen: *Steinernema riobravis*
Target host: Citrus root weevil and mole crickets
Crop/habitat: Citrus, turf
Company: Ecogen Inc.
Contact: Tim Johnson; tbjohnso@voicenet.com
Registration status: Exempt
Which countries: U.S.
Availability: None

PROTOZOA

Pathogen: *Nosema locustae*
Trade name: Nolo Bait
Target host: Grasshopper species, Orthoptera
Crop/habitat: All greenery, crops
Company: M & R Durango Inc.
Contact: Lee Anne Merrill; mrdurango@cmii.com
Registration status: Current
Which countries: U.S.A.
Availability: This would be determined on a case by case basis.

VIRUSES

Pathogen:	Baculovirus
Formulations:	Emulsifiable concentrate
Trade name:	Mamestrin
Target host:	Cabbage moth, <i>Mamestra brassicae</i> ; American bollworm, <i>Helicoverpa armigera</i> ; Diamondback moth, <i>Plutella xylostella</i> ; potato tuber moth, <i>Phthorimaea operculella</i> ; grape berry moth, <i>Lobesia botrana</i>
Crop/habitat:	Cabbage, cotton, potato, grapes
Company:	Natural Plant Protection (NPP)
Registration status:	Yes
Which countries:	France
Availability:	Yes
Pathogen:	Genetically engineered baculoviruses
Target host:	Various species of Lepidoptera
Crop/habitat:	Various row crops
Company:	American Cyanamid
Contact:	Dr. Ivan Gard; gardi@pt.cyanamid.com
Registration status:	In progress
Which countries:	USA at present
Availability:	Possibly in 1999
Pathogen:	Genetically modified baculoviruses including variants of AcMNPV, HzSNPV, and SeMNPV. Work focuses in four major areas: Molecular Biology, Production, Formulation and Biology.
Target host:	Noctuidae including Heliothines and <i>Spodoptera</i>
Crop/habitat:	Cotton and leafy vegetables
Company:	Dupont Agricultural Products
Contact:	J. Lindsey Flexner; Lindsey.Flexner @usa.dupont.com
Pathogen:	<i>Adoxophyes orana</i> granulosis virus
Trade name:	CAPEX
Target host:	<i>Adoxophyes orana</i>
Crop/habitat:	Orchards
Company:	Andermatt Biocontrol AG
Contact:	Dr. Martin Andermatt
Registration status:	Yes
Which countries:	Switzerland, Germany
Availability:	Yes

Pathogen: *Anagrapha falcifera* multicapsid nucleopolyhedrosis virus (AfMNPV)
Target host: *Heliothis*, *Helicoverpa* and *Spodoptera* spp., loopers, and other Lepidoptera.,
Crop/habitat: Vegetables, cotton, ornamentals, floriculture
Company: Thermo Trilogy Corporation
Contact: Dr. Michael Dimock; mdimock@thermotrilogy.com
Registration status: Yes
Which countries: Technical virus registered in USA (1996)
Availability: Experimental formulations available only by special arrangement

Pathogen: *Autographa californica* multicapsid nucleopolyhedrosis virus (AcMNPV)
Trade name: Gusano® biological insecticide
Target host: Miscellaneous Lepidoptera
Crop/habitat: Vegetables, cotton and other field crops, ornamentals
Company: Thermo Trilogy Corporation
Contact: Dr. Michael Dimock; mdimock@thermotrilogy.com
Registration status: Yes
Which countries: USA (1995)
Availability: Experimental formulations currently unavailable.

Pathogen: *Autographa californica* multicapsid nucleopolyhedrosis virus (AcMNPV) and other occluded baculoviruses
Target host: Lepidoptera
Crop/habitat: Agricultural crops and forestry
Company: AgriVirion Inc.
Contact: Dr. J. Lee Compton
Registration status: No

Pathogen: *Cydia pomonella* granulosis virus (CpGV)
Trade name: Cyd-X® biological insecticide
Target host: *Cydia pomonella* (codling moth)
Crop/habitat: Apples, pears, walnuts
Company: Thermo Trilogy Corporation
Contact: Dr. Michael Dimock; mdimock@thermotrilogy.com
Registration status: Yes
Which countries: USA (1995)
Availability: Experimental formulations currently unavailable.

Pathogen: *Cydia pomonella* granulosis virus
Trade name: MADEX
Target host: *Cydia pomonella*
Crop/habitat: Orchards
Company: Andermatt Biocontrol AG
Contact: Dr. Martin Andermatt
Registration status: Yes
Which countries: Switzerland, Germany, Spain
Availability: Yes

Pathogen:	<i>Cydia pomonella</i> granulosis virus
Trade name:	Granupom
Target host:	<i>Cydia pomonella</i> (codling moth)
Crop/habitat:	Apples, pears, walnuts
Company:	AgrEvo GmbH
Registration status:	Yes
Which countries:	Germany, Switzerland
Availability:	Yes
Pathogen:	<i>Cydia pomonella</i> granulosis virus
Trade name:	Carpovirusine
Target host:	<i>Cydia pomonella</i> (codling moth)
Crop/habitat:	Apples, pears, walnuts
Company:	Natural Plant Protection (NPP)
Registration status:	Yes
Which countries:	France
Availability:	Yes
Pathogen:	<i>Helicoverpa zea</i> single capsid nucleopolyhedrosis virus (HzSNPV)
Trade name:	GemStar® biological insecticide
Target host:	<i>Helicoverpa</i> spp. (tobacco budworm, bollworms, corn earworm, tomato fruitworm)
Crop/habitat:	Cotton, vegetables
Company:	Thermo Trilogy Corporation
Contact:	Dr. Michael Dimock; mdimock@thermotrilogy.com
Registration status:	Yes
Which countries:	Registered in USA (1995). Registrations pending in Australia, Mexico and Thailand.
Availability:	Experimental samples by special arrangement. Commercial availability in USA through Helena Chemical Company
Pathogen:	Nuclear polyhedrosis virus
Trade name:	Product under development
Target host:	Lepidoptera
Company:	SDS Biotech K.K.
Contact:	Mr. Masaji Kinoshita, Dr. Satoshi Yamanaka
Pathogen:	<i>Oryctes</i> baculovirus
Formulations:	Tissue culture virus stable for up to 7 years if refrigerated, several weeks at tropical temperatures
Target host:	Coconut palm rhinoceros beetle
Crop/habitat:	Coconuts in Tropics
Company:	HortResearch
Contact:	Dr. Paul D. Scotti; pscotti@hort.cri.nz
Registration status:	Not necessary
Which countries:	Used in Maldive Islands, Philippines, Samoa, Tonga, Fiji, Indonesia
Availability:	Yes

Pathogen: *Spodoptera exigua* multicapsid nucleopolyhedrosis virus (SeMNPV)
Trade name: SPOD-X[®] biological insecticide
Target host: *Spodoptera exigua* (Beet armyworm)
Crop/habitat: Vegetables, cotton, vines, ornamentals, floriculture
Company: Thermo Trilog Corporation
Contact: Dr. Michael Dimock; mdimock@thermotrilogy.com
Registration status: Yes
Which countries: The Netherlands (1993), USA (1995) and Thailand (1996).
 Registration pending in Mexico
Availability: Experimental samples by special arrangement. Commercial availability in USA through Helena Chemical Company, in Thailand through Hoescht Schering AgrEvo (Thai) Ltd. and in The Netherlands through Brinkman B.V.

Pathogen: *Spodoptera littoralis* polyhedrosis virus
Trade name: Spodopterin
Target host: *Spodoptera littoralis*
Crop/habitat: Cotton, corn, tomatoes
Company: Natural Plant Protection (NPP)
Registration status: Yes
Which countries: France
Availability: Yes

TRANSGENIC PLANTS

Pathogen: *Bacillus thuringiensis*; transgenic plants
Target host: European corn borer
Crop/habitat: Corn
Company: Plant Genetic Systems
Contact: Peter Denolf; denolf@pgsgent.be

Pathogen: *Bacillus thuringiensis*, transgenic plants
Trade name: StarLink[™]
Target host: European corn borer, Southwestern corn borer
Crop/habitat: Bt corn - contains cry9c from *Bacillus thuringiensis* sub sp. *tolworthi*
Company: AgrEvo USA
Contact: Keith Newhouse; keith.newhouse@agrevo.com, Sue MacIntosh; susan.macintosh@agrevo.com
Registration status: Yes
Which countries: U.S.A., pending in Japan, Europe, Argentina and Canada
Availability: Yes, seed also available for testing

CONTRACT SERVICES

- Company:** Benzon Research
Contact: Gary Benzon; gbenzon@aol.com
Aims: Independent research firm specialising in laboratory and field testing of microbial control products including *Bacillus thuringiensis*, *B. sphaericus* and viruses. Works with most arthropod hosts especially mosquitoes and other public health pests. Speciality markets include urban/public health and forestry.
- Company:** Biotechnological Laboratory
Contact: Dr. Konrad Bernhard; konrad.bernhard@t-online.de
Aims: Laboratory and contract research aimed at isolation of microorganisms, development of microbial products mainly for agricultural, pharmaceutical and technical applications. Has collection of over 5,000 Actinomycetes and Bacilli. A speciality is microbial insecticides based on *Bacillus thuringiensis* and fungi.
- Company:** Natural Plant Protection (NPP)
Aims: Technology transfer and partnership in biological control R & D. Following technologies are available: production of insect viruses by mass rearing technology; production of entomopathogenic and antagonistic fungi by solid fermentation technology; optimization of fermentation technology for new strains; sample production for R & D purposes.
- Company:** Ricera, Inc.
Contact: Ross Halliday; Halliday_R@Ricera.com
Aims: Biological Services group carries out efficacy, formulation and regulatory studies. Work with other companies to discover and develop new materials.
- Company:** Xenotype Ltd.
Contact: Paul van Poppelen; paul.van_poppelen@virgin.net
Aims: Anaerobic and aerobic biological treatment of industrial and municipal waste waters and effluents. Abatement of public nuisances due to insect pests arising from such installations and other aquatic environments. Emphasis is given to biological means through habitat manipulation, application of microbial insecticides - including *Bacillus thuringiensis*, augmented by chemical insecticides where necessary. Activities include research as well as design and implementation of practical and economic control measures. Speciality: non-biting midges (chironomids and psychodids).

INDEX OF PATHOGENS

<i>Adoxophyes orana</i> granulosis virus.....	15
<i>Anagrapha falcifera</i> multicapsid nucleopolyhedrosis virus	16
<i>Autographa californica</i> multicapsid nucleopolyhedrosis virus.....	16
<i>Bacillus sphaericus</i>	5
<i>Bacillus thuringiensis</i>	1, 18
<i>Bacillus thuringiensis</i> strain cs-8	3
<i>Bacillus thuringiensis</i> strain YBt-1520	1
<i>Bacillus thuringiensis</i> var. <i>aizawai</i>	2
<i>Bacillus thuringiensis</i> var. <i>aizawai</i> strain GC91	2
<i>Bacillus thuringiensis</i> var. <i>chinesensis</i> strain CT-43.....	2
<i>Bacillus thuringiensis</i> var. <i>galleriae</i> , wild type strain	2
<i>Bacillus thuringiensis</i> var. <i>israelensis</i>	3
<i>Bacillus thuringiensis</i> var. <i>israelensis</i> strain 187.....	3
<i>Bacillus thuringiensis</i> var. <i>kurstaki</i>	4-6
<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> strain SAH.....	4
<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> strain SA12	4
<i>Bacillus thuringiensis</i> var. <i>tenebrionis</i>	5
Baculoviruses	15
<i>Beauveria bassiana</i>	6, 7
<i>Beauveria brongniartii</i>	7
<i>Beauveria</i> spp.	7
<i>Chondrostereum purpureum</i>	7
<i>Cydia pomonella</i> granulosis virus	16, 17
<i>Gliocladium virens</i> strain GL-21	8
<i>Helicoverpa zea</i> single capsid nucleopolyhedrosis virus.....	17
<i>Heterorhabditis bacteriophora</i>	11
<i>Heterorhabditis megidis</i>	11, 12
<i>Heterorhabditis</i> spp.....	12
<i>Lagenidium giganteum</i>	8
<i>Metarhizium anisopliae</i>	8
<i>Metarhizium anisopliae</i> var. <i>acridum</i>	9
<i>Metarhizium</i> spp.	7
<i>Myrothecium verrucaria</i>	9
<i>Nomuraea rileyi</i>	9
<i>Nosema locustae</i>	14
Nuclear polyhedrosis virus	17
<i>Oryctes baculovirus</i>	17
<i>Paecilomyces fumosoroseus</i>	9
<i>Paecilomyces fumosoroseus</i> strain Apopka 97	10
<i>Spodoptera exigua</i> multicapsid nucleopolyhedrosis virus	18
<i>Spodoptera littoralis</i> polyhedrosis virus	18
<i>Steinernema carpocapsae</i>	12, 13
<i>Steinernema feltiae</i>	13
<i>Steinernema riobrave</i> (=riobravis).....	14
<i>Steinernema</i> spp.	12
Steinernematid nematodes	12
<i>Trichoderma harzianum</i>	10
<i>Verticillium lecanii</i>	10, 11

INDEX OF TARGET HOSTS

<i>Adoryphouse couloni</i>	8
<i>Adoxophyes orana</i>	15
<i>Aedes</i>	3
<i>Alternaria</i>	10
<i>Anopheles</i>	3, 5
Aphids	10, 11
<i>Aprion germani</i>	2
Armyworms	6, 12
<i>Batrachedra amydraula</i>	1
Beet armyworm	18
<i>Belonolaimus</i>	14
<i>Bemisia tabaci</i>	10
Billbugs	12
Black Vine weevil	11
Blackflies	3
Bollworms	15, 17
<i>Botrytis</i>	10
Cabbage moth	15
Citrus root weevil	14
Coconut palm rhinoceros beetle	17
Codling moth	16, 17
Coleoptera	2, 5-9, 11, 12
Colorado Potato Beetle	5
Corn earworm	7, 17
<i>Criconemella</i>	14
<i>Cryptothelea minuscula</i>	2
<i>Culex</i>	3, 5
Curculionids	12
Cutworms	12
<i>Cydia pomonella</i>	16, 17
<i>Dendrolimus</i>	2
<i>Dendrolimus punctatus</i>	1
Diamondback moth	15
<i>Diaprepes abbreviatus</i>	14
Diptera	2, 3, 6, 7, 10
Elm Bark Beetle	5
European corn borer	18
Fleas	12
Fungus gnats	3, 12, 13
<i>Fusarium</i>	8, 10
Grape berry moth	15
Grasshoppers	9, 14
Grubs	11
<i>Helicoverpa</i> (= <i>Heliothis</i>)	15-17
<i>Helicoverpa armigera</i>	1, 2, 15
<i>Helicoverpa zea</i>	1
Heteroptera	6
Homoptera	6-8, 10
Insects	7
Lepidoptera	1, 2, 4, 6-9, 11, 12, 15-17
Limacodidae	2

<i>Lobesia botrana</i>	15
<i>Locustana pardalina</i>	9
Locusts.....	9
Loopers	16
<i>Mamestra brassicae</i>	15
<i>Meloidogyne</i>	14
<i>Melolontha melolontha</i>	7
Mole crickets	13, 14
Mosquitoes	3, 5, 8
Museidae.....	2
Mushroom flies	13
Nematodes	9, 14
Noctuidae	15
Orthoptera	6, 8, 14
<i>Ostrinia nubilalis</i>	1, 2, 7
<i>Otiorhynchus sulcatus</i>	11, 12
<i>Pachneus</i>	14
<i>Phthorimaea operculella</i>	15
<i>Phytophthora</i>	10
<i>Pieris rapae</i>	1
<i>Plutella xylostella</i>	1, 2, 15
Potato tuber moth.....	15
<i>Prunus serotina</i> (black cherry)	7
<i>Pythium</i>	8
Red-headed cockchafer.....	8
<i>Rhizoctonia</i>	8, 10
Root weevils	12
Root-rot and damping-off pathogens.....	8
<i>Rosellinia</i>	10
<i>Scapteriscus</i>	14
Sciarids	11, 13
<i>Sclerotinia</i>	8
<i>Sclerotium</i>	8, 10
Soil and cryptic insects	12
Southwestern corn borer.....	19
Spidermites	10
<i>Spodoptera</i>	15, 16
<i>Spodoptera exigua</i>	18
<i>Spodoptera littoralis</i>	18
Stem borers.....	12
Sweetpotato whitefly.....	10
Thrips	6, 10
Tobacco budworm	17
Tomato fruitworm.....	17
<i>Trialeuroides vaporariorum</i>	10
Vine weevil	8, 12
Webworms	12
Whiteflies	10

INDEX OF CROPS AND HABITATS

Agricultural crops.....	14, 16
Apples	16, 17
Beans	10, 11
Cabbages	2, 9, 15
Cauliflowers	2
Cereals	4
Citrus.....	9, 14
Coconuts	17
Coffee.....	6
Conservation areas.....	9
Corn	7, 18
Cotton.....	1, 2, 4, 15-18
Cucumber.....	10, 11
Datepalm	1
Drainage ditches.....	3, 5
Eggplant	5, 10, 11
Field crops.....	1, 2, 4, 6, 16
Floriculture.....	16, 18
Flowers.....	6-10
Forestry	1, 2, 4, 7, 16
Fruit.....	1, 4, 7, 9, 10, 12
Gardens	2, 11, 12
Grapes	15
Grassland.....	7, 8
Greenery	14
Greenhouse.....	2, 4, 13
Greenhouse ornamentals and vegetables.....	3, 6
Hay.....	6
Herbs.....	12, 13
Horticulture	7, 11, 12
Indoor/outdoor nursery.....	6
Lakes.....	3, 8
Landscape ornamentals and vegetables	6
Lawns.....	11, 12
Lettuce	10, 11
Maize.....	1, 2
Mushrooms.....	13
Nursery.....	10-12
Nuts.....	4
Oil palms	7, 9
Orchard fruits and nuts	2, 4
Orchards	1, 15, 16
Ornamentals.....	1, 2, 4-6, 8-13, 16, 18
Pastures	7, 8
Pears.....	16, 17
Ponds	3, 5, 8
Potatoes	5, 7-9, 15
Rangeland.....	9
Rice.....	1, 3, 5, 8
Rivers	3
Row crops	6, 15
Salt marshes	5

Seedling cultivation.....	13
Sewage	3
Shade trees	5
Stored commodities	4
Strawberries	11
Swamps	3, 5
Sweet corn	6
Sweet pepper	10, 11
Tea.....	1
Tobacco	4
Tomatoes	5, 10, 11, 18
Tree nurseries	11
Turf.....	1, 6-9, 11, 12, 14
Vegetables	1, 2, 4, 6-10, 12, 13, 15-18
Vernal pools	8
Vines	18
Viticulture	7
Walnuts	16, 17
Wetlands	8

INDEX OF COMPANIES AND ADDRESSES

Abbott Laboratories	2-5, 9
1401 N. Sheridan Road North Chicago, IL 60064 U.S.A. Tel: 800-323-9597 Fax: 847-934-3769	
Ago Biocontrol	6-10
Transversal 84 A No. 138-95 or Krr 80 A No. 74-93 Bogotá COLOMBIA Tel: 6815134/6858630/2525593 Fax: 6832691	
AgraQuest, Inc.....	8
1105 Kennedy Place Suite 4 Davis CA 95616 U.S.A. Tel: 916-750-0150 Fax: 916-750-0153	
AgrEvo GmbH	17
Pflanzenschutz Deutschland Postfach 19 03 20 D-40511 Düsseldorf GERMANY Tel: 49-211-95080 Fax: 49-211-9508101	
AgrEvo USA Co.....	18
14665 Galaxie Avenue West Suite 300 Apple Valley, MN 55124 U.S.A. Tel: 612-997-4500 Fax: 612-997-4507	
AgriVirion Inc.	16
460 West 25 th Street New York, NY 10001 U.S.A. Tel: 212-463-7325 Fax: 212-463-7325	

American Cyanamid.....	15
P.O. Box 400	
Princeton, NJ 08543-0400	
U.S.A.	
Tel: 609-716-2136	
Fax: 609-275-3521	
Andermatt Biocontrol AG	7, 11, 13, 15, 16
Unterdorf	
CH-6146 Grossdietwil	
SWITZERLAND	
Tel: 062-927-2840	
Fax: 062-927-2123	
Bayer AG.....	8
Werk Leverkusen	
51368 Leverkusen	
GERMANY	
Tel: 49-214-301	
Benzon Research	19
208 Burnt House Road	
Carlisle, PA 17013	
U.S.A.	
Tel: 717-258-1183	
Fax: 717-258-1195	
BioLogic Company.....	12
P.O. Box 177	
Willow Hill, PA 17271	
U.S.A.	
Tel: 717-349-2789/2922	
Bio-Care Technology Pty. Limited	8
R.M.B. 1084 Pacific Highway	
Somersby	
NSW 2250	
AUSTRALIA	
Tel: 02-4340-2246	
Fax: 02-4340-2243	
Biological Control Products SA (Pty) Ltd. (BCP).....	9
P.O. Box 1561	
Pinetown 3600	
SOUTH AFRICA	
Tel: 031-700-4525	
Fax: 031-700-1338	
Biotechnological Laboratory	19
D-79539 Lörrach	
Wiesentalstrasse 75	
GERMANY	
Tel: 0049-7621-165600	
Fax: 0049-7621165600	

DuPont Agricultural Products	15
Stine-Haskell Research Center	
Elkton Road	
Newark, DE 19714	
U.S.A.	
Tel: 302-451-4861	
Fax: 302-366-6503	
Eric Schweizer Seeds Ltd.	7
P.O. Box 150	
CH-3602 Thun	
SWITZERLAND	
Tel: 033-227-5757	
Fax: 033-227-5758	
Ecogen Inc	5, 6, 11, 14
2005 W. Cabot Boulevard	
P.O. Box 3023	
Langhorne, PA 19047-3023	
U.S.A.	
Tel: 215-757-1590	
Fax: 215-757-2956	
e-nema GmbH.....	11, 13
Klausdorfer Str. 28-36	
24223 Raisdorf	
GERMANY	
Tel: 49-4307-838813	
Fax: 49-4307-838314	
HortResearch	17
Private Bag 92 169	
Auckland	
NEW ZEALAND	
Tel: 64-9-8493660	
Fax: 64-9-8154201	
Huazhong Agricultural University.....	1-3
Laboratory of Pesticidal Microbiology	
Department of Microbial Science and Technology	
Huazhong Agricultural University	
Wuhan 430070	
P.R. CHINA	
Tel: 86-27-7396030	
Fax: 86-27-7393882	
Jewin-Joffe Industry Limited.....	1
Shalom Tower	
22 nd Floor	
P.O. Box 29511	
Tel-Aviv 61294	
ISRAEL	
Tel: 972-3-5170034	
Fax: 972-3-5100050	

Koppert Biological Systems B.V.....	7, 10-13
P.O. Box 155	
2650 AD Berkel en Rodenrijs,	
THE NETHERLANDS	
Tel: 31-10-51-404-44	
Fax: 31-10-51-121-57	
M & R Durango Inc.	14
P.O. Box 886	
Bayfield, CO 81122	
U.S.A.	
Tel: 970-259-3521	
Fax: 970-259-3857	
Mycotech Corporation.....	6
P.O. Box 4109	
Butte, MT 59702	
U.S.A.	
Tel: 406-723-7770	
Fax: 406-723-7770	
Natural Plant Protection (NPP).....	7, 15, 17-19
Route d'Artix	
BP 80	
64150 Nogueres	
FRANCE	
Tel: 559-84-1045	
Fax: 559-84-8955	
Plant Genetic Systems.....	18
J. Plateaustraat 22	
B-9000 Gent	
BELGIUM	
Tel: 32-9-235-8491	
Fax: 32-9-224-0694	
Ricera, Inc.	19
7528 Auburn Road	
Painesville, OH 44077	
U.S.A .	
Fax: 440-354-4415	
SDS Biotech K.K.	1, 12, 17
2-12-7, Higashi-Shinbashi	
Minatoku	
Tokyo 105	
JAPAN	
Tel: 81-3-3436-3811	
Fax: 81-3-3436-0989	
Scientific & Technological Developing.....	1
Corporation of Fujian Agricultural University	
Fujian Agricultural University	
Fuzhou	

P.R. CHINA
Tel: 86-591-3741224
Fax: 86-591-3741928

Thermo Trilogy Corporation 2-4, 8, 10, 12-14, 16-18
9145 Guildford Road, Suite 175
Columbia, MD 21046
U.S.A.
Tel: 800-847-5620
Fax: 301-604-7015

Tuticorin Alkali Chemicals and Fertilisers Limited.....2,5
East Coast Centre, 553
Anna Salai, Teynampet
Chennai - 600 018
INDIA
Tel: 91-44-4345276/4349560/4349824/4342360
Fax: 91-44-4348044
Telex: 041-23183 GRAMS: TACFERT

Xenotope Ltd. 19
P.O. Box 1
New Romney
Kent TN28 8YN
UK
Tel: +44-1797 361631
Fax: +44-1797 361193

INDEX OF TRADE NAMES

12AS	3
32 LV.....	4
48 LV.....	4
AGO BIOCONTROL BASSIANA 50	6
AGO BIOCONTROL BEAUVERIA 50.....	7
AGO BIOCONTROL METARHIZIUM 50.....	8
AGO BIOCONTROL NOMURAEA 50.....	9
AGO BIOCONTROL PAECILOMYCES 50	9
AGO BIOCONTROL TRICHODERMA 50	10
AGO BIOCONTROL VERTICILLIUM 50.....	10
Agree®	2
Bactimos®	3
Beauveria Schweizer®	7
BIO 1020	8
Biobit® XL, HP	4
BIOCHON.....	7
BioGreen™ Granules.....	8
Biosafe	12
BioSafe® biological insecticide.....	12
BioVector® biological insecticide.....	12
BioVector® 355 biological insecticide	14
Bitayon®	1
BotaniGard ES.....	6
Bt 8010.....	1
CAPEX	15
Carpovirusine	17
CornGard ES and G.....	6
CoStar®	4
Cruiser.....	11
Crymax.....	6
Cyd-X® biological insecticide	16
Delfin®	1, 4
Design®	2
Devour® biological insecticide.....	14
Dickmaulrüsslernematoden.....	11
Dipel® DF, ES, 4L, 10G, SG Plus	4
DiTera® ES, WDG, G	9
ECOMASK.....	12
Engerlingspilz	7
Entonem.....	13
Foray® 48B, 48F, 76B.....	4
GemStar® biological insecticide.....	17
Gnatrol®	3
Granupom	17
Green Muscle	9
Gusano® biological insecticide.....	16
HETEROMASK.....	12
Javelin®	4
JieJueLing preparation.....	3
LAGINEX™.....	8
LARVANEM.....	12
Lepinox.....	6

MADEX.....	16
Magnet [®] biological insecticide	13
Mamestrin.....	15
Metarhizium Schweizer [®]	7
Mianfeng pesticide.....	1
MieJueLing preparation.....	3
MYCOTAL	10
Mycotrol WP and ES.....	6
nema-green	11
nema-plus.....	13
nema-top	11
Nolo Bait.....	14
Novodor [®]	5
Ostrinil	7
PFR-97™ biological insecticide	10
Raven.....	5
Rijin	1
Savior [®] biological insecticide	12
SCANMASK	12
SCIA-RID.....	13
Shuangdu preparation	2
SoilGard™ biological fungicide.....	8
Spicbiomoss	5
Spicturin	2
SPOD-X [®] biological insecticide.....	18
Spodopterin	18
StarLink™	18
TEKNAR [®]	3
TEKNAR [®] HPD	3
THURICIDE	1, 4
TRAUNEN	13
Turex [®]	2
VectoBac [®] G.....	3
VectoLex [®]	5
Vector [®] MC biological insecticide	14
Vector [®] TL biological insecticide.....	12
VERTALEC.....	11
X-Gnat [®] biological insecticide	13
XenTari [®]	2