



BRAZILIAN MARKET FOR BIOCONTROL

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WHEN YOU THINK OF BRAZIL...



Carnival



Amazon



Football

WE ARE ALSO...



Food



Biofuel



Feed

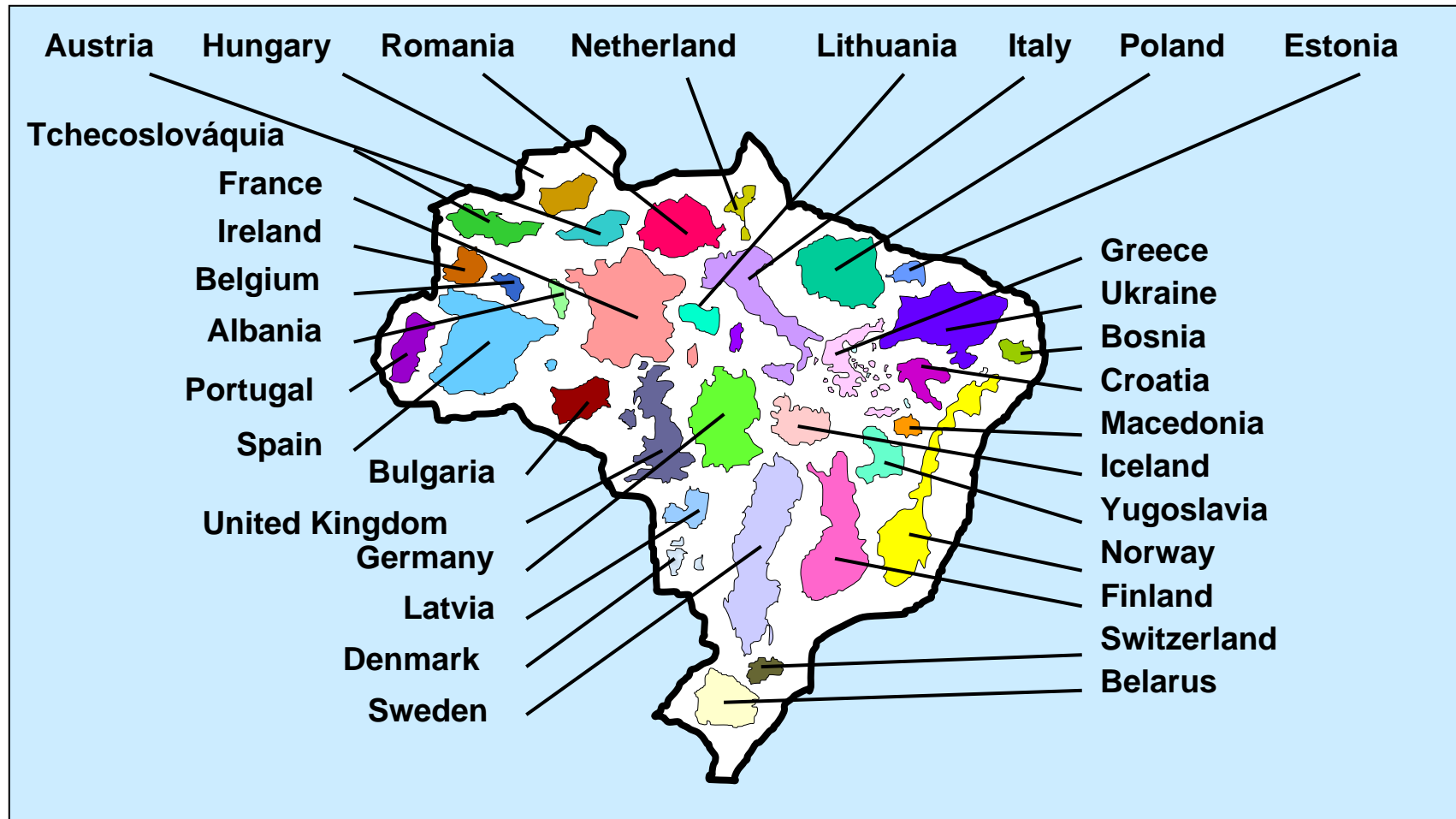
BRAZIL - OVERVIEW

- ✓ Area: 8.514.204,86 Km²
- ✓ Population 194 million inhabitants
- ✓ Language: Portuguese (only)
- ✓ Tropical Country

Pasture	215
Annual Crops	47
Permanent Crops	15
Available Agribusiness Area	90
Sub-total	367



BRAZIL: POTENTIAL SOIL FOR AGRIUSE (367 million hectares)



Source: J.L.Coelho, John Deere, 2001

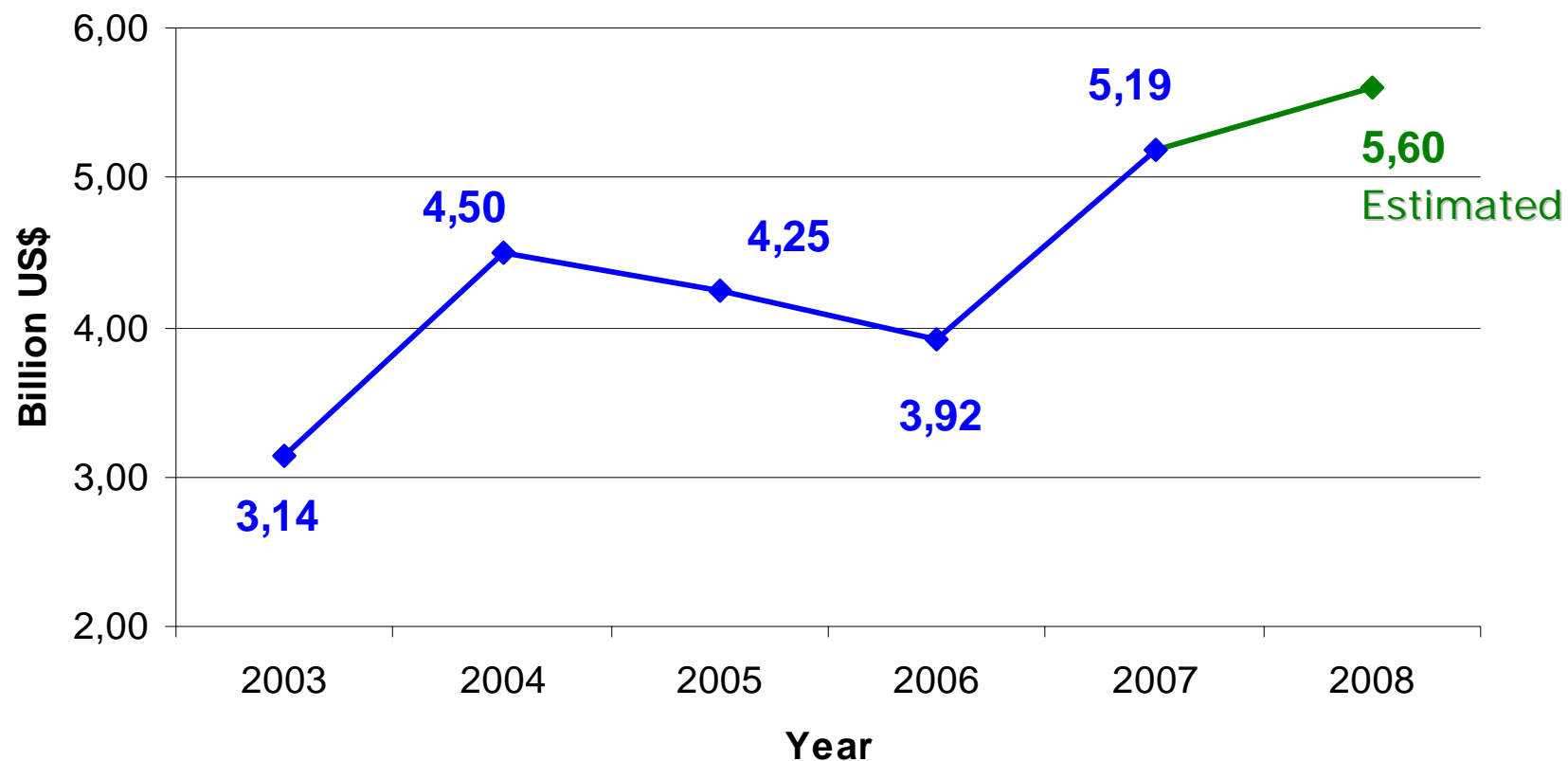
MAIN CROPS PLANTED AREA (´000 Ha) - 2007

Soybean¹	21.219	Sorghum¹	767
Corn¹	13.817	Cacao¹	675
Sugar Cane¹	6.692	Banana²	498
Eucalyptus/Pinus	5.600	Tobacco²	473
Bean¹	3.833	Coconut²	283
Rice¹	2.895	Potato¹	142
Wheat¹	2.286	Grape²	75
Coffee¹	2.224	Tomato²	56
Cotton¹	1.121	Apple²	36
Orange¹	801	Stone Fruit	25
		Melon³	16
		Pasture	>200.000

¹ Source: Instituto Brasileiro de Geografia e Estatística - IBGE

² Source: Ministério da Agricultura, Pecuária e Abastecimento

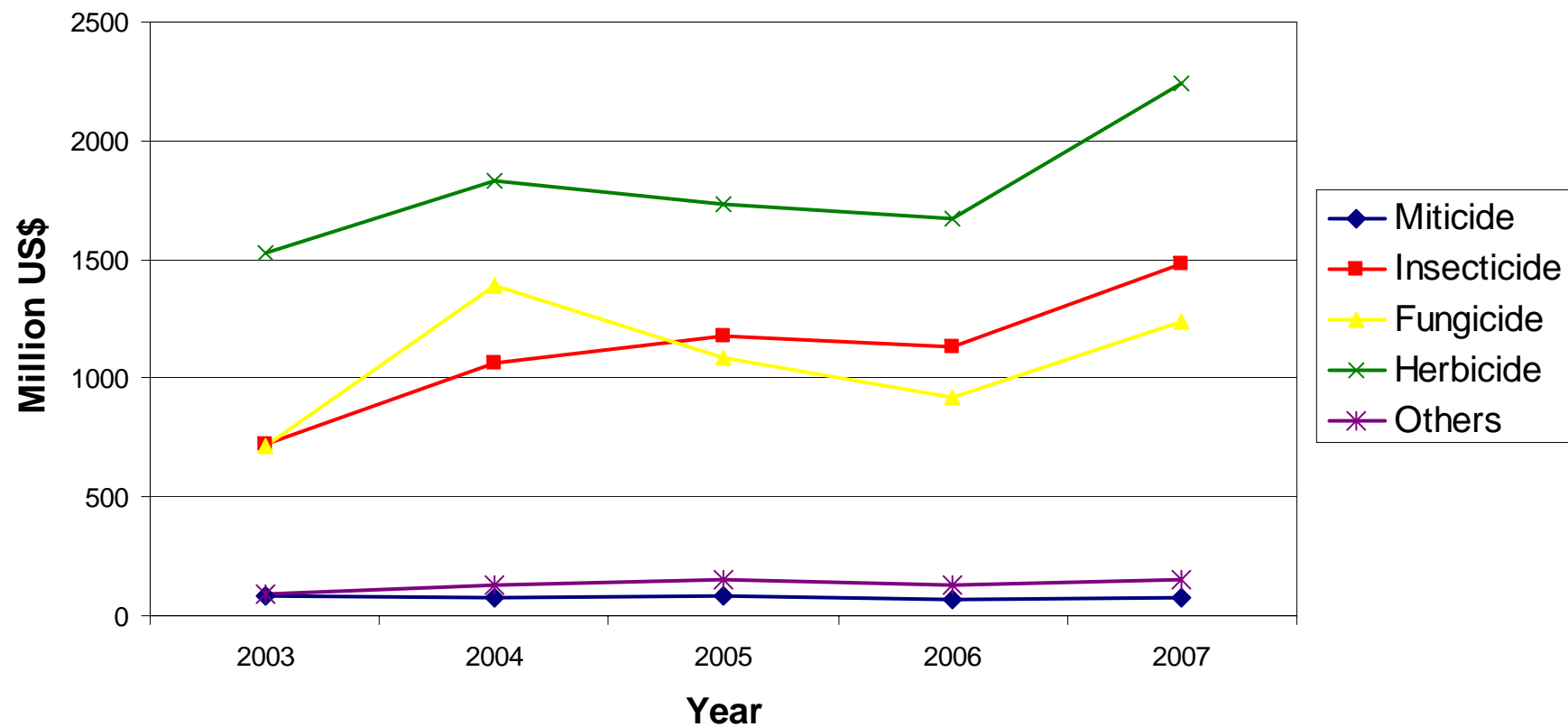
BRAZIL PESTICIDE MARKET EVOLUTION



Source: SINDAG (www.sindag.org.br)

BRAZIL PESTICIDE MARKET EVOLUTION

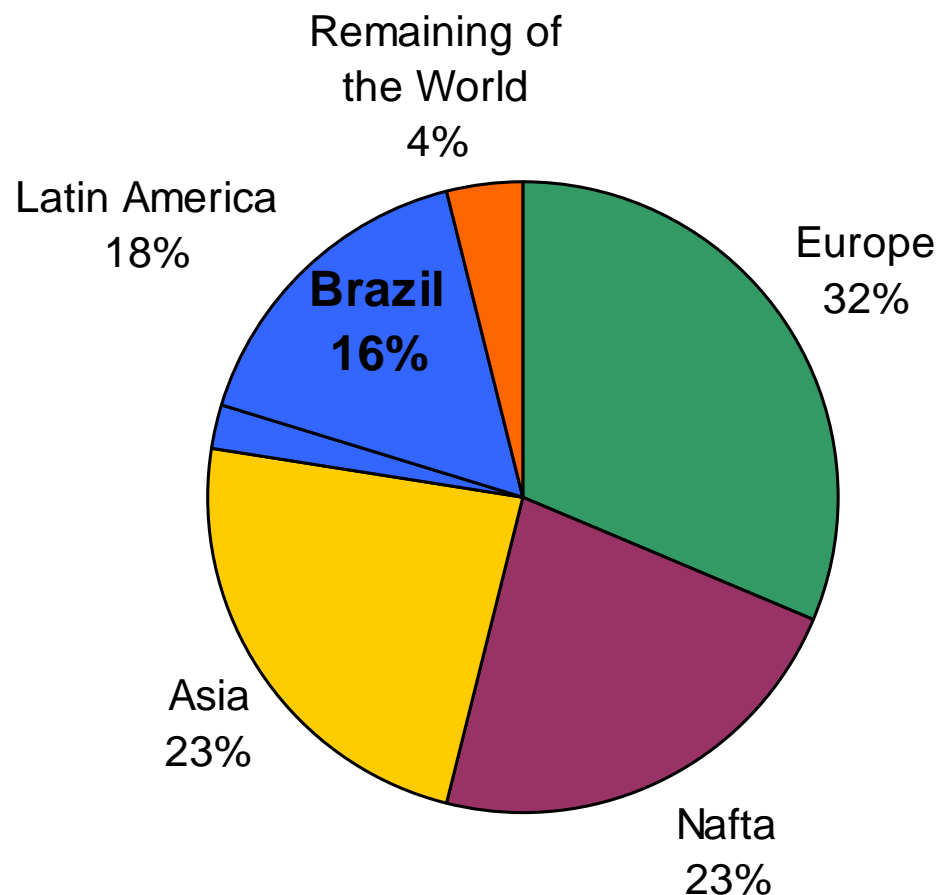
By Product Class



Source: SINDAG (www.sindag.org.br)

PESTICIDE MARKET IN THE WORLD

Participation of Brazil



REGION	2007 (US\$ billion)
Europe	10,42
Nafta	7,49
Asia	7,78
Latin America	6,17
Brazil	5,37
Remaining of the World	1,33
TOTAL GLOBAL	33,19

Source: Associação Brasileira dos Defensivos Genéricos - AENDA

BIOCONTROL MARKET SITUATION IN BRAZIL

OVERVIEW

- ✓ Key manufacturers:
 - Small and medium size companies
 - Research institutes
 - Cooperatives
 - Agri-industries
- ✓ 'Handmade' formulations
- ✓ Recent specific legislation (2006)
- ✓ Foundation of ABCBio (2008)

BIOCONTROL MARKET SITUATION IN BRAZIL

WEAKNESSES

- ✓ chemical pesticides culture.
- ✓ Insufficient knowledge in biological control (research and use).
- ✓ Small divulgue and transferring of techniques.
- ✓ Small quality of biological products.
- ✓ Specificity of biological agents.
- ✓ Needs of federal and state register.
- ✓ Small government incentive.
- ✓ Low technical farmers level.

BIOCONTROL MARKET SITUATION IN BRAZIL

STRENGTHS & OPPORTUNITIES

- ✓ Climatic conditions and biodiversity favorable to establish of insect parasitoids, predators and pathogens (microorganisms)
- ✓ Govern fund increasing for biopesticides developing.
- ✓ Food free of residues, mainly for exporter products.
- ✓ Consumers looking for healthier foods
- ✓ Increase demand of organic crops.
- ✓ Resistance management of pests.

BIOCONTROL MARKET SITUATION IN BRAZIL

VIRUSES

BIOCONTROL AGENT	TARGET PEST	CROP	MARKET
IN USE			
AgMNPV	<i>Anticarsia gemmatalis virus</i>	soybean	Treated area 650,000 to 2 million hectares / year
IN DEVELOPMENT			
EeGV	<i>Erinnys ello virus</i>	Manioc / cassava	-
SfMNPV	<i>Spodoptera frugiperda virus</i>	corn	-
CvMNPV	<i>Condylorrhiza vestigialis virus</i>	poplar	-
PhopGV	<i>Phthorimaea operculella virus</i>	potato	-

BIOCONTROL MARKET SITUATION IN BRAZIL

FUNGUS

BIOCONTROL AGENT	TARGET PEST / DISEASE	CROP	MARKET
IN USE			
<i>Metarrhizium anisopliae</i>	<i>Mahanarva fimbriolata</i>	sugar cane	600 000 ha / year
	<i>Mahanarva posticata</i>	pasture	50 000 ha / year
<i>Beauveria bassiana</i>	<i>Hypothenemus hampei</i>	coffee	1000 ha / year
	<i>Cosmopolites sordidus</i>	banana	NA
<i>B. bassiana</i> + <i>M. anisopliae</i>	<i>Sphenophorus levis</i> and <i>Metamasius hemipterus</i>	Sugar cane	NA
	mites, trips and whiteflies	Greenhouse	NA
<i>Sporothrix insectorum</i>	<i>Leptopharsa heveae</i>	Brazilian rubber tree	NA

BIOCONTROL MARKET SITUATION IN BRAZIL

FUNGUS

BIOCONTROL AGENT	TARGET PEST / DISEASE	MARKET
IN USE		
<i>Trichoderma</i> spp	<i>Fusarium, Rhizoctonia, Pythium, Sclerotinia sclerotiorum, Colletotrichum lindemuthianum, Plasmopara, Cercospora coffeicola, Phoma costaricensis, Botrytis cinerea, Rosellinia necatrix, Phytophthora, Verticillium.</i>	Production of 550 ton/year (rice or millet grains) 13 companies manufacturer
IN DEVELOPMENT		
<i>Metarrhizium flavoviridae</i>	grasshopper	

BIOCONTROL MARKET SITUATION IN BRAZIL

BACTERIAS



BIOCONTROL AGENT	TARGET PEST / DISEASE	CROP	MARKET
IN USE			
<i>Bacillus thuringiensis aizawai and kurstaki</i>	<i>Spodoptera frugiperda</i>	cotton and corn	Bt kurstaki 200 ton/year Bt aizawai 60 ton/year
	<i>Thyrinteina arnobia</i>	forestry	
	<i>Ecdytolopha aurantiana</i>	citrus	
	<i>Anticarsia gemmatalis</i>	soybean	
	<i>Diaphania hyalinata and D. nitidalis</i>	cucurbitae	
	<i>Eacles imperialis magnifica</i>	coffee	
	<i>Erinnyis ello</i>	manioc	
	<i>Tuta absoluta and Neoleucinodes elegantalis</i>	tomato	
	<i>Plutella xylostella</i>	crucifers	

BIOCONTROL MARKET SITUATION IN BRAZIL

BACTERIAS

BIOCONTROL AGENT	TARGET PEST / DISEASE
IN USE	
<i>Bacillus thuringiensis israelensis (Bti)</i>	Used in Health Ministry programs to control of <i>Aedes aegypt</i> (dengue vector) and simuliids.
<i>Bacillus sphaericus</i>	Used in Health Ministry programs to control of <i>Culex</i> (filarirose vector) and <i>Anopheles</i> (malaria vector).
IN DEVELOPMENT	
<i>Bacillus subtilis</i>	
<i>Streptomyces spp.</i>	
<i>Pseudomonas spp.</i>	
<i>Pasteuria penetrans</i>	

BIOCONTROL MARKET SITUATION IN BRAZIL

NEMATODES

BIOCONTROL AGENT	TARGET PEST / DISEASE	MARKET in Brasil
IN USE		
<i>Deladenus (= Beddingia) siricidicola</i>	Sirex noctilo (<i>pinus</i>)	350 000 ha
IN DEVELOPMENT		
<i>Heterorhabditis spp</i>		
<i>Steinernema spp.</i>		



BIOCONTROL MARKET SITUATION IN BRAZIL

NATURAL ENEMIES - PARASITOIDS

BIOCONTROL AGENT	TARGET PEST / DISEASE	CROP	MARKET
IN USE			
<i>Cotesia flavipes</i>	<i>Diatraea saccharalis</i>	Sugar cane	70 Producers 700.000 ha/year
<i>Trichogramma pretiosum</i>	<i>Tuta absoluta, Neoleucinodes elegantalis, Helicoverpa zea</i>	Tomato	5.000 ha/year
	<i>Helicoverpa zea, Spodoptera frugiperda</i>	Corn	150.000 ha/year
<i>Trichogramma galloi</i>	<i>Diatraea saccharalis</i>	Sugar cane	400.000 ha/year
<i>Paratheresia claripalpis</i>	<i>Diatraea saccharalis</i>	Sugar cane	
<i>Trissolcus basalus</i>	<i>Nezara viridula</i> and <i>Piezodorus guildinii</i>	Soybean	
<i>Agéniaspis citricola</i>	<i>Phyllocnistis citrella</i>	Citrus	

BIOCONTROL MARKET SITUATION IN BRAZIL

NATURAL ENEMIES – PREDATORS

BIOCONTROL AGENT	TARGET PEST / DISEASE	CROP
IN USE		
<i>Cryptolaemus montrouzieri</i>	<i>Planococcus</i>	Citrus
<i>Neoseiulus californicus</i> and <i>Phytoseiulus macropilis</i>	<i>Tetranychus urticae</i>	Ornamentals, vegetables, orchards and gardens
<i>Phytoseiulus longipes</i>	<i>Tetranychus urticae</i> and <i>Tetranychus evansi</i>	Tomato, tobacco and potato
<i>Stratiolaelaps scimitus</i>	Soil pests. Even fungus gnats in mushroom culture.	Citrus mud, eucalyptus, tobacco, vegetables, ornamentals and others

BIOCONTROL MARKET SITUATION IN BRAZIL

NATURAL ENEMIES – PREDATORS

BIOCONTROL AGENT	TARGET PEST / DISEASE	CROP
IN USE		
<i>Chrysoperla externa</i>	Aphids, cochonilhas, whiteflies, blackflies, psilidaes, trips and moths.	Ornamentals, vegetables, orchards and gardens
<i>Orius insidiosus</i>	Trips - <i>Frankliniella occidentalis</i> , <i>Caliothrips phaseoli</i> , etc.	Ornamentals, vegetables, orchards and gardens
IN DEVELOPMENT		
<i>Lysiphlebus testaceipes</i>		
<i>Phytoseiulus macropilis</i>		

BIOCONTROL MARKET SITUATION IN BRAZIL

SEMIOCHEMICALS

TARGET PEST / DISEASE	CROP	MARKET
IN USE		
<i>Anthonomus grandis</i> , <i>Pectinophora gossypiella</i>	Cotton	43 products registered for monitoring 3 products registered for matting disruption Total market: US\$ 6,500.000
<i>Lasioderma serricorne</i> , <i>Plodia interpunctella</i> , <i>Ephestia spp.</i>	Stored products	
<i>Grapholita molesta</i> , <i>Bonagota cranaodes</i>	Apple	
<i>Mygdolus fryanus</i>	Sugar cane	
<i>Ceratitis capitata</i> , <i>Ecdytolopha aurantiana</i>	Citrus	
<i>Tuta absoluta</i> , <i>Neoleucinodes elegantis</i>	Tomato	
<i>Spodoptera frugiperda</i>	Corn	
<i>Cosmopolites sordidus</i>	Banana	
<i>Plutella xylostella</i>	Vegetables	



BIOCONTROL MARKET SITUATION IN BRAZIL

NATURAL EXTRACTS

COMMERCIAL PRODUCTS	TARGET PEST / DISEASE	MARKET
IN USE		
Neem Oil	Whiteflies, thrips, cochonilhas, caterpillars and beetles	250.000 l/year
<i>Vegetal oil</i>		1.100.000 l/year
<i>Algae</i>		

BIOCONTROL MARKET SITUATION IN BRAZIL

- ✓ Size of the pesticide market.
- ✓ Pest resistance.
- ✓ Exigency of free pesticide from the USA, Japan and Europe in the Brazilian agriculture products.
- ✓ Brazilian government projects to maintain the hydric reserves free of pesticide.
- ✓ Growth of the pressure of the consumer for more healthful products.
- ✓ Organic agriculture:
 - Area (calculated): 887,600 ha
 - Producers: 15,000
 - Sales: US\$ 250 million (60% for export)

Brazilian Biocontrol Industry Association

Founded in September, 2008

Actually with 14 Brazilian companies associated.



THANK YOU !

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