

CURRENT WORLD SITUATION ON ACCEPTANCE AND MARKETING OF BIOLOGICAL CONTROL AGENTS (BCAS)

Michel Guillon, President, International Biocontrol Manufacturers' Association,
1 rue de Buckingham, 64000 Pau, France. mg.pres.ibma@club-internet.fr : www.ibma.ch

ABSTRACT

The development and marketing of biocontrol agents (BCAs) : microorganisms, macroorganisms, natural products and pheromones throughout the World are presented in this document, together with the five-year forecasts.

Under present economic conditions, with marked regression in sales of chemical plant protection products and increase in industrial GMO crop areas, BCA's are not developing as rapidly as expected : registration costs do not allow a correct return on investment and there is a lack of training and information for users.

In developing countries, there is great potential for the use of these crop protection techniques, and many opportunities to introduce alternative methods for numerous crops at an acceptable cost exist.

Key words : Biocontrol agents : market in developing countries

INTRODUCTION

After the “green” revolution in the second half of the 20th century, bringing higher yield varieties of rice, wheat and maize which more than doubled food production, there is now widespread evidence of decline in this increase in crop yields, despite new progress in agricultural and plant protection techniques

The improper use of chemical pesticides and fertilizers has lead to cumulative effects of pest resistance build-up and environmental degradation.

Rapid development of Integrated Pest Management using new alternative methods with BCAs together with questionable GM crops are transforming the agricultural world.

Producing better and “greener” in terms of natural resource and environment conservation is the new challenge. This is remarkably demonstrated in plant protection and seed market data (see figures 1 and 2).

1. Plant Protection Market

After reaching a volume of 34 billion USD in 1995, the pesticide market is declining slowly and continuously : reduction of pesticide use (IPM) and GM crop development. In terms of business, development of GM seed business compensates the decline in volume of pesticide business and total sales will remain at constant levels during the five coming years.

From 2008 onwards, new constraints will appear : pest resistance to GM crops, tighter residue regulations, need to protect new transgenic high nutritional value crops. At this stage, generalisation of sustainable agriculture combining ecological approaches and application of modern technologies will boost a new generation of chemical pesticides as well as alternative methods.

2. BCA market

BCAs can be classified as follows :

- Macrobiotics : beneficials, nematodes, ...
- Microbiotics : virus, fungi, bacteria, ...
- Semio-chemicals : behaviour modifying agents for control of pest populations
- Natural products : plant extracts with insecticide, fungicide or SAR (Systemic Activated Resistance) effect

BCAs are used in two types of agriculture :

- Organic farming where no chemical inputs are permitted
- Integrated crop production programmes which reduce pesticide use, resulting in improved conservation of the environment and better quality food (less pesticide residues), ...

Although more than 1 000 different products or technologies are available through more than 350 manufacturers in the world, use of BCAs is still marginal : they represent around 2% of total of plant protection inputs market at end user prices with around 588 million USD.

There are now good opportunities for development in both organic crop culture and in development of alternative methods in integrated crop production.

3. Development of organic agriculture

In 2003, 22 811 627 hectares were cultivated by organic farmers, according to the SOEL report (Stiftung Oekologie und Landbau, a German Association for organic farming) and IFOAM (International Federation of Organic Agriculture Movements). This represents an increase of 35% compared to 2002, (see Figure 3).

However, if organic farming is progressing strongly, this report shows big differences : Oceania (Australia and New Zealand) represent 46.3% of areas with more than 10.5 million hectares. Australia with 10 million hectares groups only 1 380 organic farmers, whilst in Uganda, 122.000 ha are cultivated by 28 200 organic farmers.

The two most important countries, Australia (10 million hectares) and Argentina (3.2 million hectares) have mostly organic grasslands for extensive cattle breeding.

In Europe, organic farming areas reach 5 million hectares, representing 2% of agricultural land, whilst in North America, only 1 500 000 hectares, represent only 0.25% of crop area.

In Asia, China is also progressing : 40 000 ha in 2 000 to 30 000 ha in 2003, but this is still not significant – Japan has only 5 000 ha certified for organic food production.

In Africa, organic farming is developing, mostly in the Southern part of the continent : Uganda, Tanzania, Kenya and South Africa, where the fruit and vegetable production is destined for export to Europe where demand for organic produce is increasing strongly.

Many farmers in developing countries are “organic” by necessity, since they have no access to or funds to buy chemical inputs.

Integrated Food Production

In developing countries use of alternative methods began slowly 20 years ago. Developments of pest resistance to chemicals, stricter legislation on residue levels and environmental protection laws have contributed to development and registration of BCAs.

In Europe, 50% of fruit and vegetable productions are conducted with the use of at least one alternative method :

- Mating disruption (use of pheromones) and viruses for apples, pears, ...
- Beneficials for production of vegetable crops under glass
- Mass trapping (pheromones) for control of rice borer, ...

In tropical areas, use of pheromones for control of banana weevil by mass trapping is developing strongly in industrial plantations.

Constraints

Most BCAs (such as virus) present very specific activities and consequently narrow markets.

* Cost of registration

This is evidently the principal obstacle to development of new products and systems. BCAs are subject to prohibitive registration fees and extremely high costs for providing data in Europe and Nafta.

For such reasons, development of microbials has been slow. New simple procedures for registration of pheromones and natural products will permit the economical development of many new products in the near future.

* Market structure

The structure of the global BCA market is significantly different to that of the traditional chemical crop protection industry. Over the past three years, 90% of the value of the global agrochemical market has been concentrated in the hands of 7 multinational companies. The majority of BCA manufacturing firms have sales of 1 to 2 million USD, most of which are founded on intellectual property rights to a simple novel technology with some commercial potential, frequently originating from non-profit or academic research.

Although all leading agrochemical companies have undertaken research into the potential of BCAs, they have disvested this business in favour of the potential higher returns of GM crops. Certain leading Japanese companies are an exception to this trend, several of them have invested, developed and launched BCA based products.

CONCLUSION

BCAs offer a great potential, but the industry remains small and fragmented. Significant investments can still be envisaged in primary high value crops such as fruits and vegetables under glass.

The key to the long term growth of the BCA industry is to target products into areas in which demand already exists and to generate demand for alternative products and methods by educating users on the benefits of such techniques.

Main examples of long term growth could be in development programmes for

- * Banana weevil (and Sweet potato weevil)
“Attract and Kill” technology provides up to 95% control and suppression of chemical treatments in industrial banana plantations.
- * Potato tuber moth
Mass trapping gives good results in Latin America for control of insecticide resistant populations.
- * SAR, Microbials and Natural Products
The majority of new products under development are targeted on plant resistance enhancers – a new class of plant protectants with very good business potential.

The environmental benefits of BCA products, their suitability for use in IPM strategies and the increasing regulatory pressure offers significant opportunities for the biocontrol industry to expand beyond niche markets into mainstream crop protection.

Figure 1

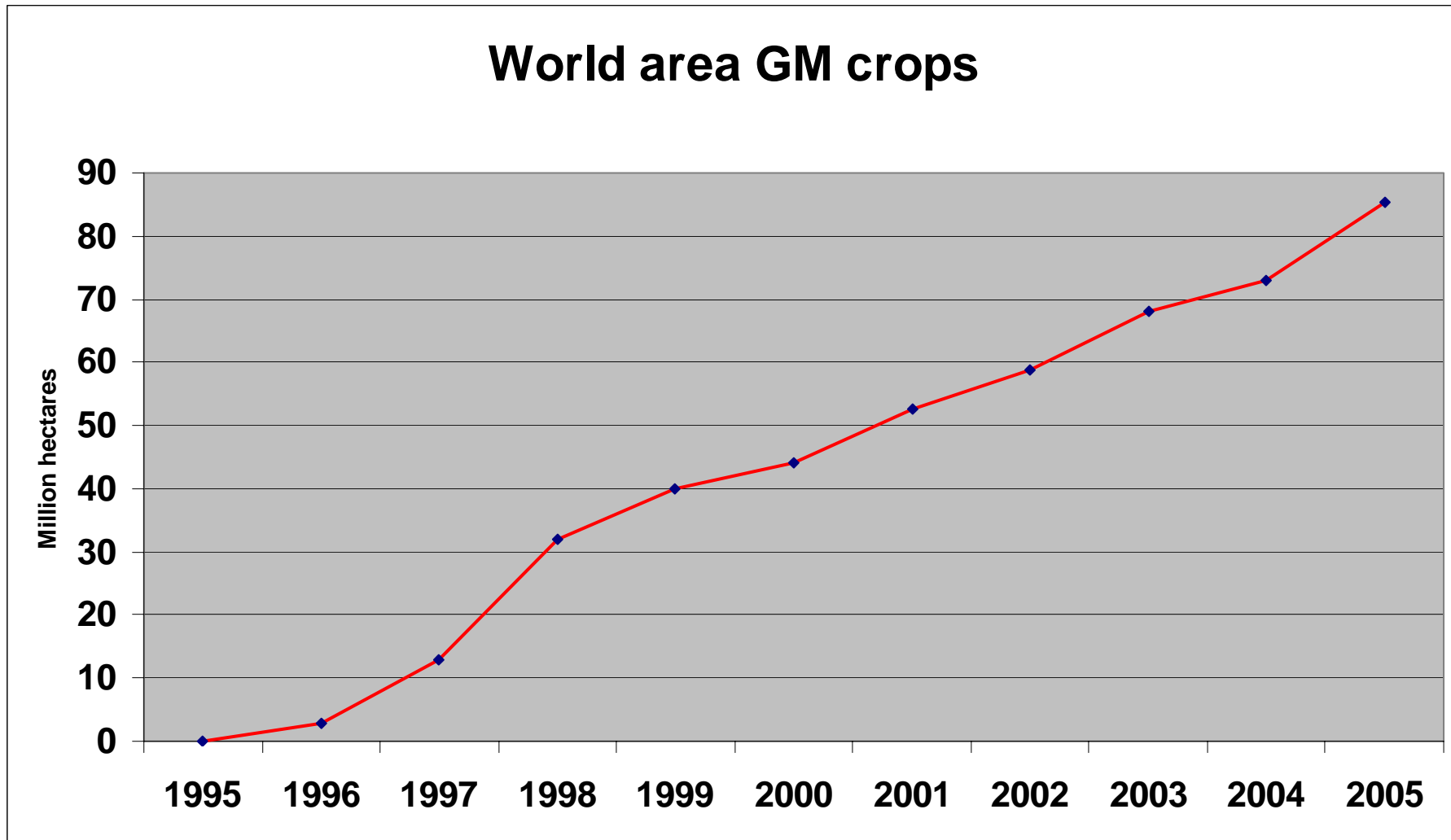


Figure 2

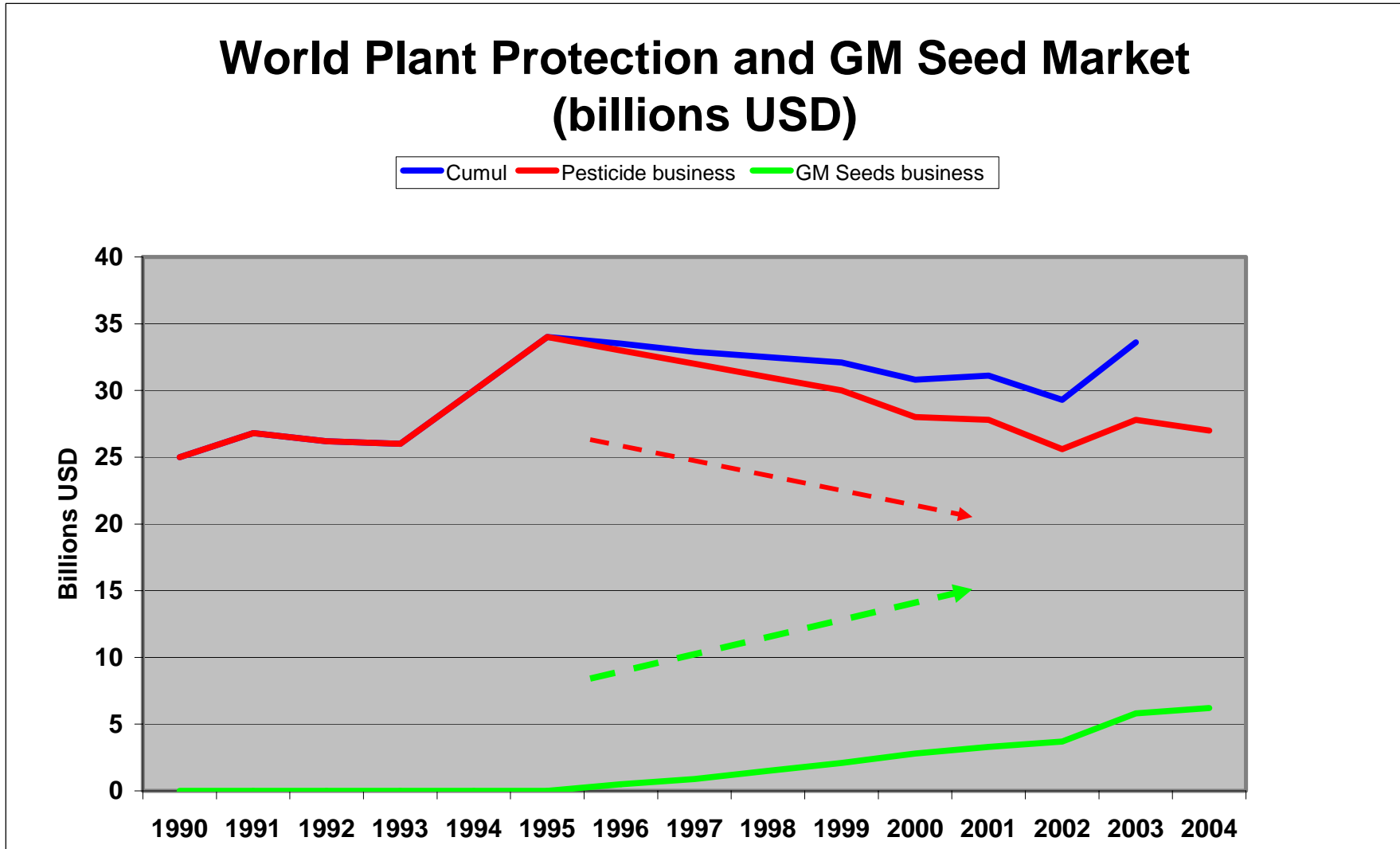


Figure 3

ORGANIC FARMING AREAS BY CONTINENT

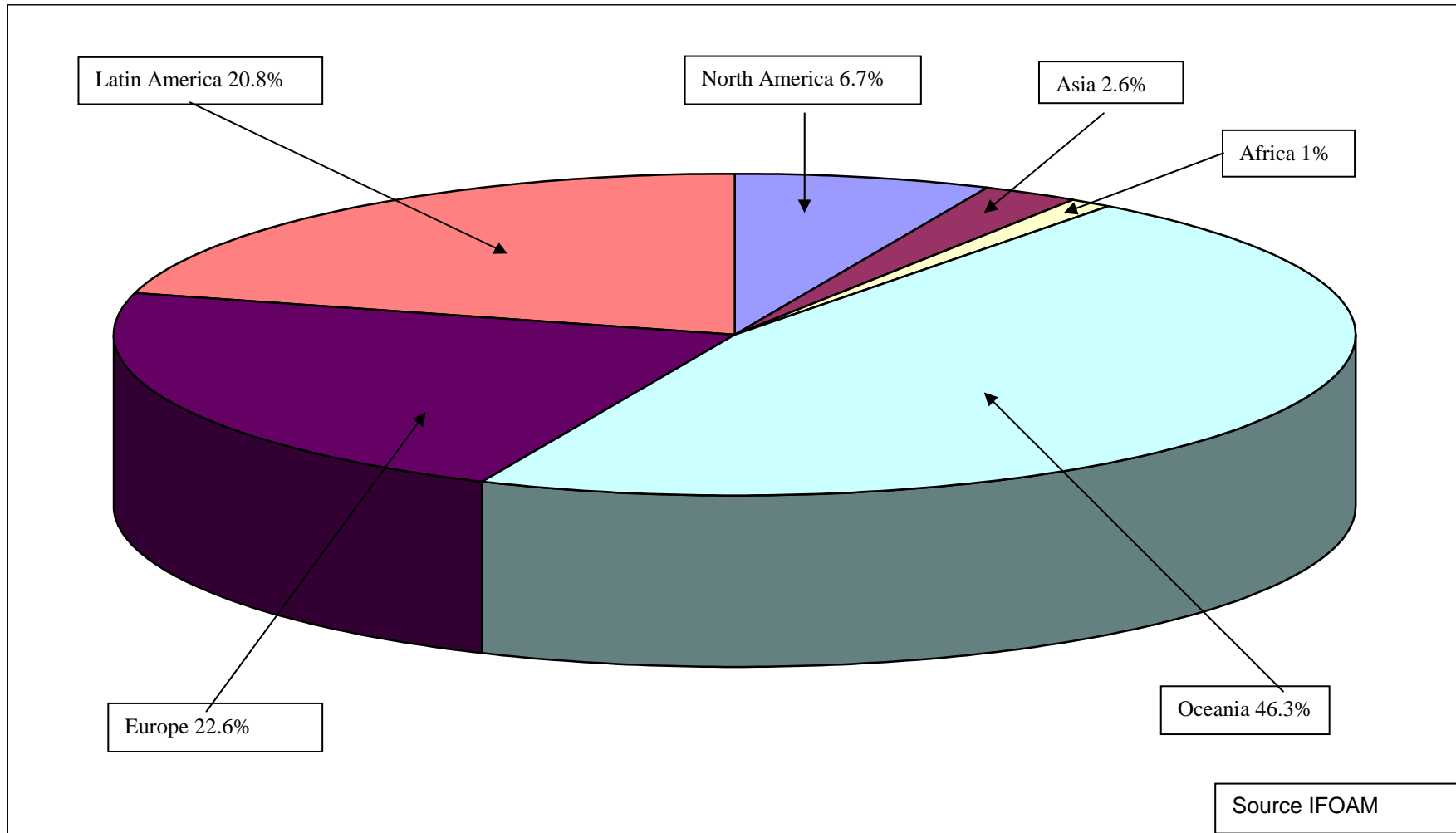


Table 1**ESTIMATED WORLD BIOCONTROL MARKET IN 2003**

	EUROPE	NAFTA	LATIN AMERICA	AFRICA	ASIA	OCEANIA	TOTAL
Macrobials	60	80	10	5	20	15	190
Microbials :							
- Bacteria	20	90	10	5	15	30	170
- Virus	6	4	5	1	3	2	21
- Fungi	5	15	10	1	7	6	44
Total	31	109	25	7	25	38	235
Biorationals							
- Natural	15	40	10	3	12	4	84
- Semiochemicals	16	27	4	8	15	9	79
Total	31	67	14	11	27	13	163
TOTAL	122	256	49	23	72	66	588

(Revised 04.04)

Table 2

**WORLD BIOCONTROL MARKET
2008 FORECAST : 1000 Million USD**

(Revised 04.04)

	EUROPE	NAFTA	LATIN AMERICA	AFRICA	ASIA	OCEANIA	TOTAL
Macrobials	70	100	15	8	30	20	243
Microbials							
- Bacteria	15	80	10	5	20	30	160
- Virus	10	15	10	2	5	10	42
- Fungi	25	45	20	3	15	20	128
Total	50	140	40	10	40	60	330
Biorationals							
- Natural	30	70	25	10	40	15	180
- Semiochemicals	40	80	20	10	30	20	200
Total	70	150	45	20	70	35	390
TOTAL	190	390	100	38	140	115	973

Figure 4

ESTIMATED WORD BIOCONTROL MARKET BY CONTINENT

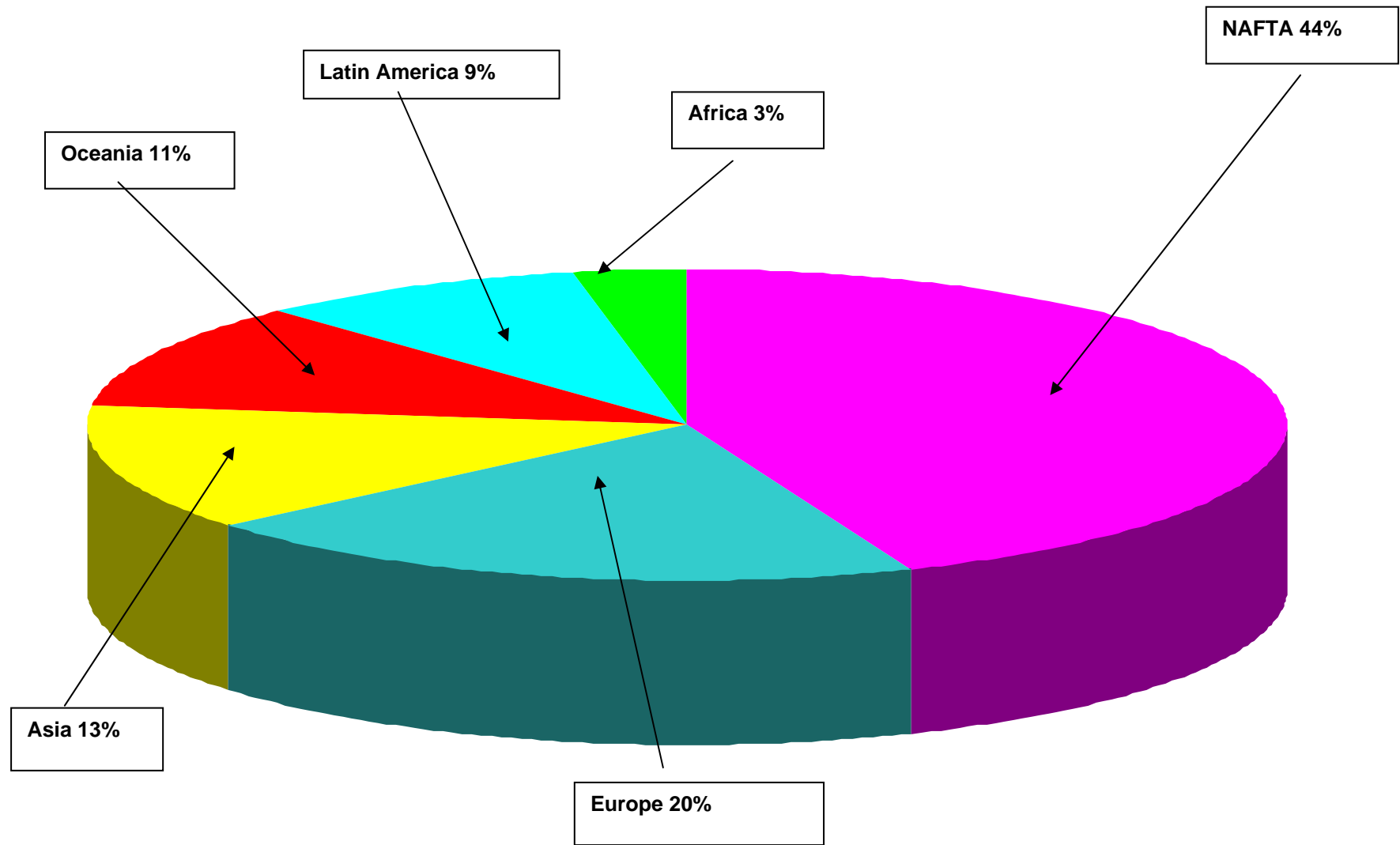


Figure 5

ESTIMATED BIOCONTROL MARKET BY TYPE OF PRODUCT

