

Examples of Application of IPM under IOBC Concept and Guidelines of Integrated Production

Malavolta Carlo



***IOBC/WPRS Commission
IP Guidelines and Endorsement***

**Thematic strategy on sustainable use of pesticides
1 st meeting of expert group**

Bruxelles June 4 th 2009

IOBC WPRS

**International Organization for the Biological
and Integrated Control of Noxious
Animals and Plants (IOBC)
<http://www.iobc-global.org/>**

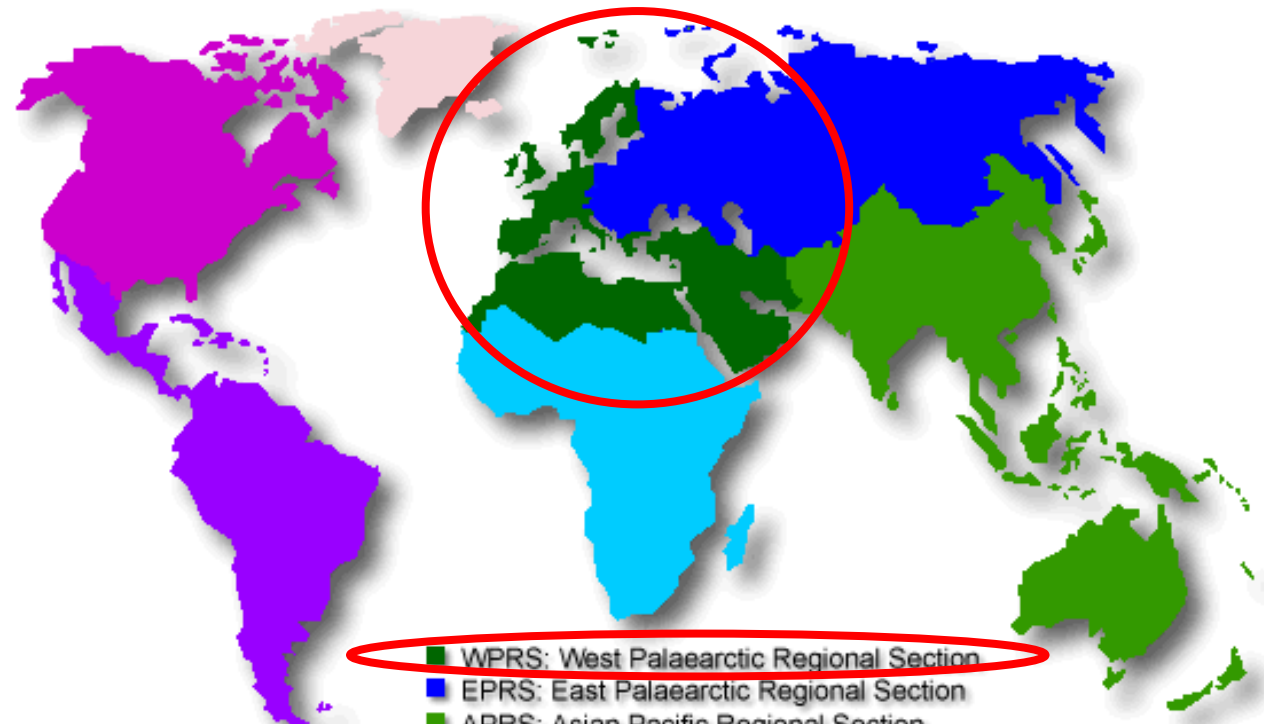
**Scientific Non-profit, Non
Governmental Organisation
since 1956**



International Organisation for Biological and Integrated Control of Noxious Animals and Plants (IOBC)
West Palaearctic Regional Section (WPRS)
Organisation Internationale de Lutte Biologique et Intégrée contre les Animaux et les Plantes Nuisibles (OILB)
Section Régionale Ouest Paléarctique (SROP)

IOBC-WPRS
OILB-SROP

West Palaearctic Regional Section: one of 6 regional sections of IOBC



- WPRS: West Palaearctic Regional Section
- EPRS: East Palaearctic Regional Section
- APRS: Asian Pacific Regional Section
- ATRS: African Tropical Regional Section
- NRS: Nearctic Regional Section
- NTRS: Neo Tropical Regional Section

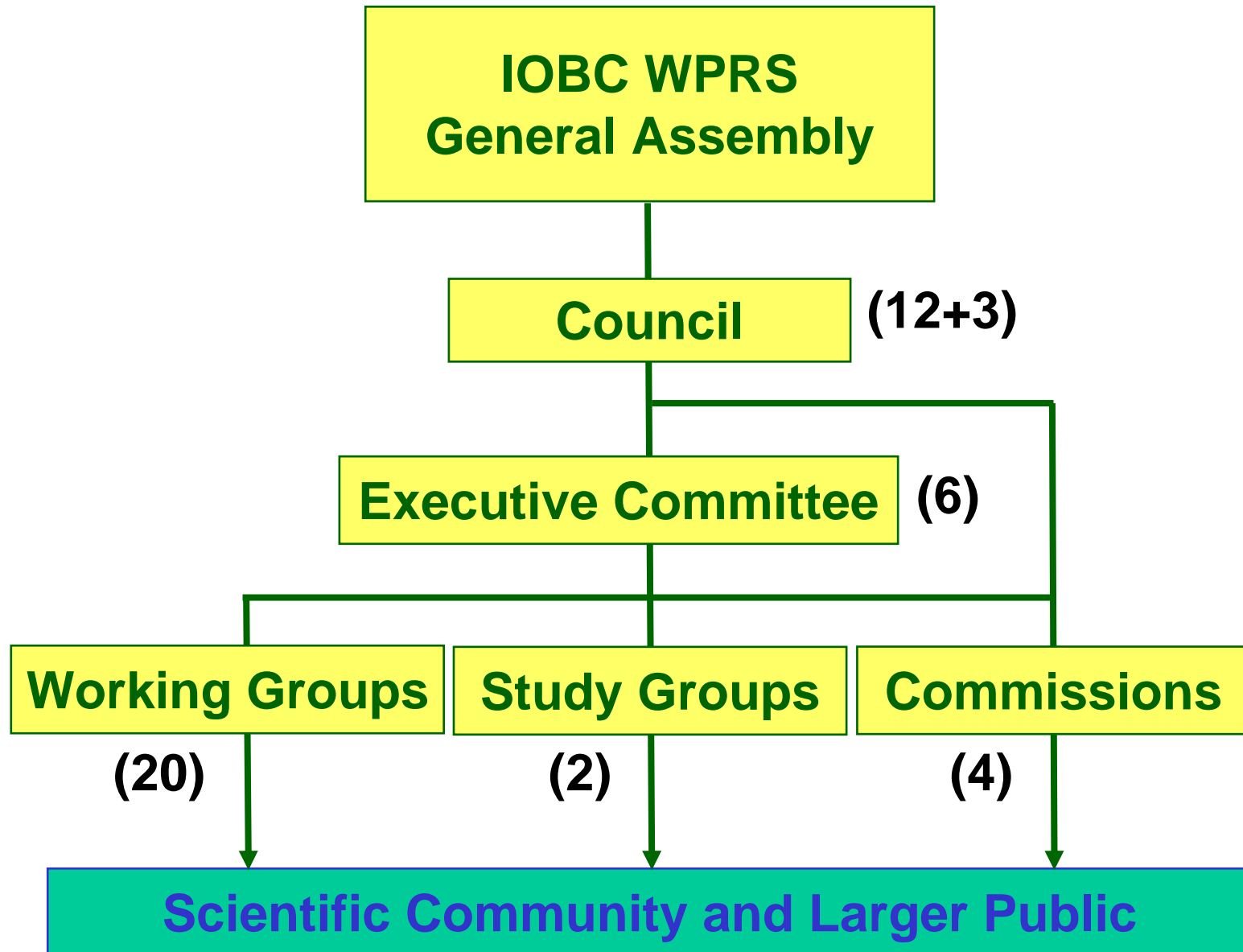
<http://www.iobc-global.org>

<http://www.iobc-wprs.org>

IOBC OBJECTIVES

- Promote research and implementation of **sustainable** (environmentally safe, economically feasible, socially acceptable) **control-methods of pests** of agricultural and forestry crops
- Promote the development of **biological control** and its application in Integrated pest management and Integrated Production programmes

ORGANIZATION OF IOBC WPRS



IOBC WPRS ACTIVITIES

- **Organisation of scientific meetings to foster exchange of information and ideas**
- **Presentation platforms: workshops, symposia, proceedings, publications**
- **Implementation of scientific knowledge into advising & executing production**
- **Collaboration with other international organisations**
- **Production of Guidelines for integrated production**

ACTIVITIES IN INTEGRATED PRODUCTION

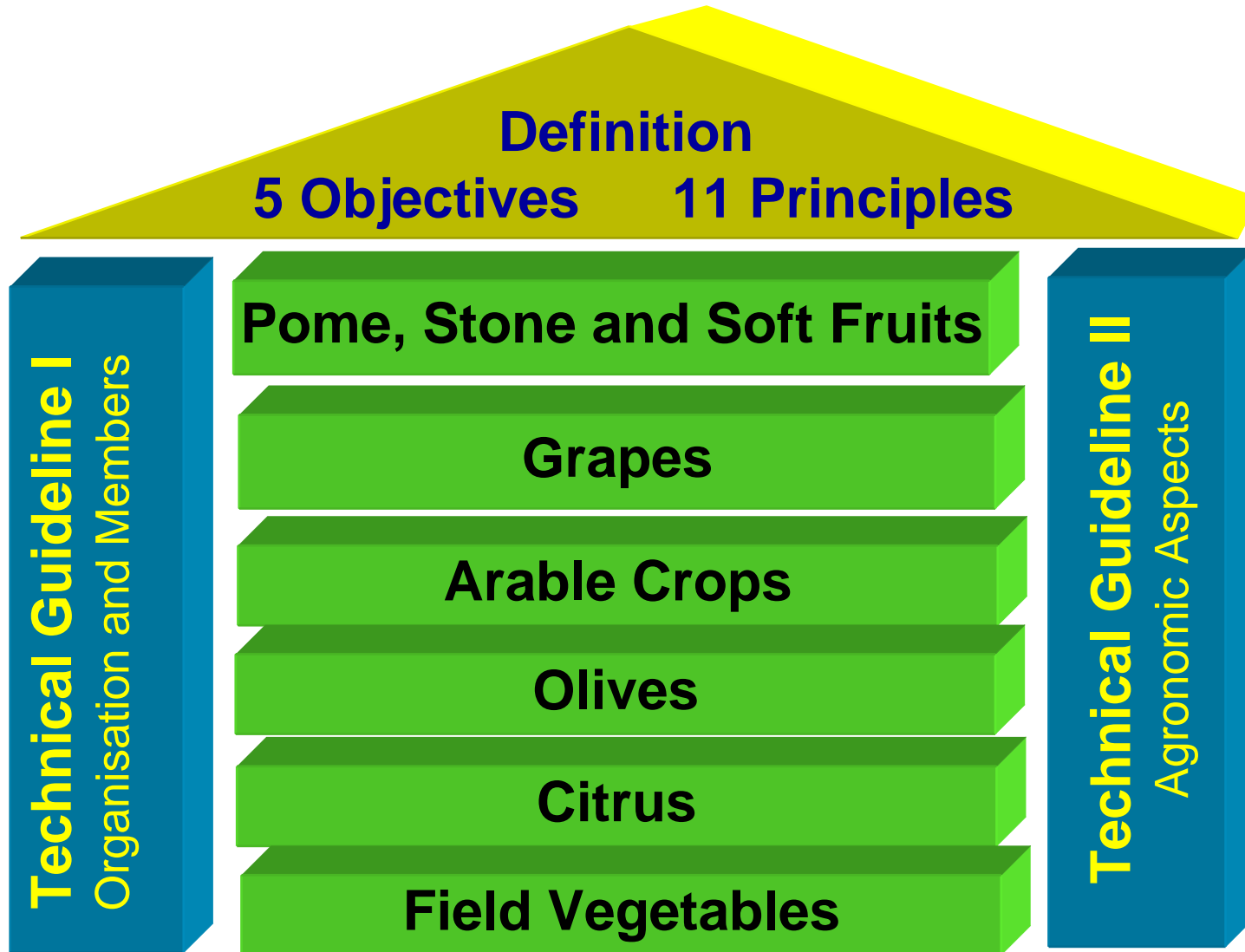
- **Production of Guidelines**
- **Endorsement of growers' organizations**

Commission
IP Guidelines and Endorsement
(<http://www.iobc.ch>)

IOBC BASIC DOCUMENTS ON IP

- **Guidelines for Integrated Production. Principles and Technical Guidelines**
 - **1993: First edition**
 - **1999: Second edition**
 - **2004: Third edition (IOBC/WPRS Bull. 27(2))**
- **Developed by**
 - **IOBC/WPRS Executive Committee and Council**
 - **Experts that represent the Working Groups**
 - **Commission on Integrated Production**

THE IOBC CONCEPT OF IP



IP PRINCIPLES

- 1. IP IS APPLIED ONLY HOLISTICALLY**
- 2. EXTERNAL COSTS AND UNDESIRABLE IMPACTS ARE MINIMISED**
- 3. THE ENTIRE FARM IS THE UNIT OF IP IMPLEMENTATION**
- 4. THE FARMERS' KNOWLEDGE OF IP MUST BE REGULARLY UP-DATED**

IP PRINCIPLES

- 5. STABLE AGROECOSYSTEMS MUST BE MAINTAINED AS KEY COMPONENTS**
- 6. NUTRIENT CYCLES MUST BE BALANCED AND LOSSES MINIMISED**
- 7. INTRINSIC SOIL FERTILITY MUST BE PRESERVED AND IMPROVED**
- 8. IPM IS THE BASIS FOR DECISION MAKING IN CROP PROTECTION**

IP PRINCIPLES

- 9. BIOLOGICAL DIVERSITY MUST BE SUPPORTED**
- 10. TOTAL PRODUCT QUALITY MUST BE CONSIDERED**
- 11. ANIMAL PRODUCTION ON MIXED FARMS MUST TAKE INTO ACCOUNT ANIMAL WELFARE**

Structure of IP Crop specific guidelines

- choice of plantation site
- plantation system
- seeding/rotation
- soil management
- fertilisation
- plant protection and weed control
- ecological infrastructures
- irrigation
- harvest

Specific guidelines for IP label

- Post harvest treatment
- storage/conservation
- selection
- quality index
(harvest/commercialisation)
- packaging
- commercialisation
- self (in-home) checking proc. + external checking proc.

IP Guidelines (1)

- Fertilisation:
 - limit to distribution of N, P and K
 - nutrient need based on crop uptake and soil content availability (soil analysis)
 - limits to timing and max quantity/application (=split application)
 - specific rules for organic fertilisers

IP Guidelines (2)

- Plant protection & weed control:
 - prevention by preliminary choice (e.g.resistant cvs)and agronomic methods (e.g.rotation)
 - treatment applied only when necessary (by theresholds, forecasting models, etc.) and with correct timing (forecasting models, bullettins, ecc.)
 - a.i. choice based on lower impact on human health and environment (priority to biological/biotechnol.= e.g. mating disruption)
 - checking and calibration of spraying machines

IP Guidelines (3)

- Crop rotation:
 - crop rotation of min 4 crops of min 10% of total farm area
 - reseeded of same crop normally not permitted (exception for certain crop/area)
 - further limitations in crop frequency (intervals larger or not permission of certain crops)
- Growth regulators: not permitted (some exceptions on fruit/vegetables)

IP Guidelines (4)

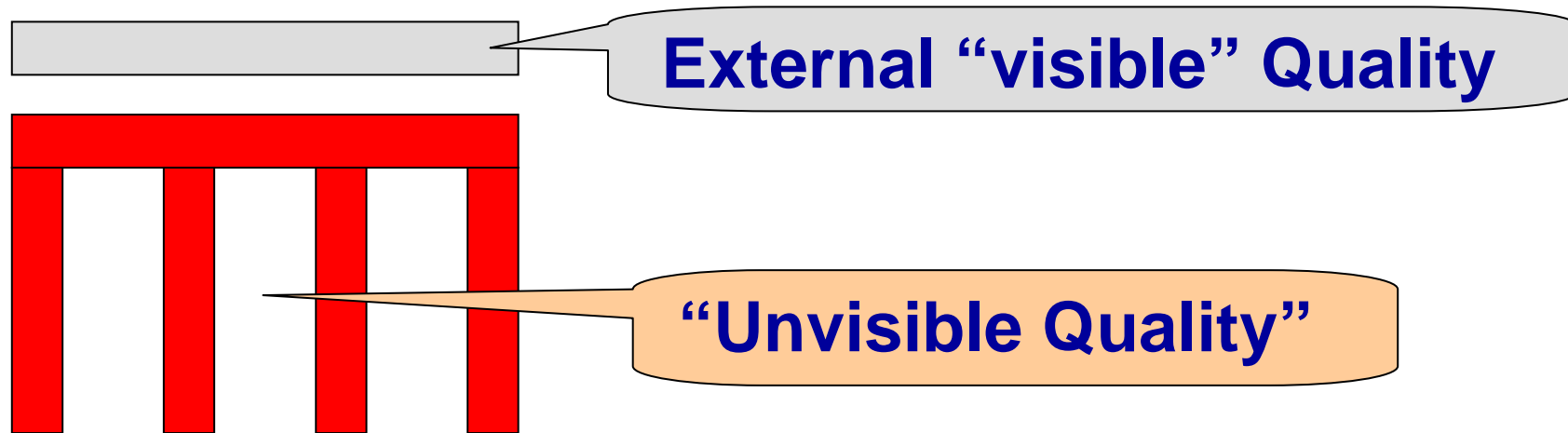
- Registration:
 - field books (fertilisers + pesticides + harvest data)
 - storage books (fertilisers + pesticides)
- Obligation to involve all crops or group of crops (e.g. pome fruits)

THE THIRD EDITION OF BASIC DOCS

- The concept and the principles remain unchanged
- Questions omitted or not fully developed in the previous editions
 - Basic elements on legal compliance
 - Good Agricultural Practices
 - Total quality of the product
- “Compatibilisation” of IOBC standards with market standards without eroding high IOBC standard
- Technical Guidelines cannot mention all published “must”

PRODUCT TOTAL QUALITY

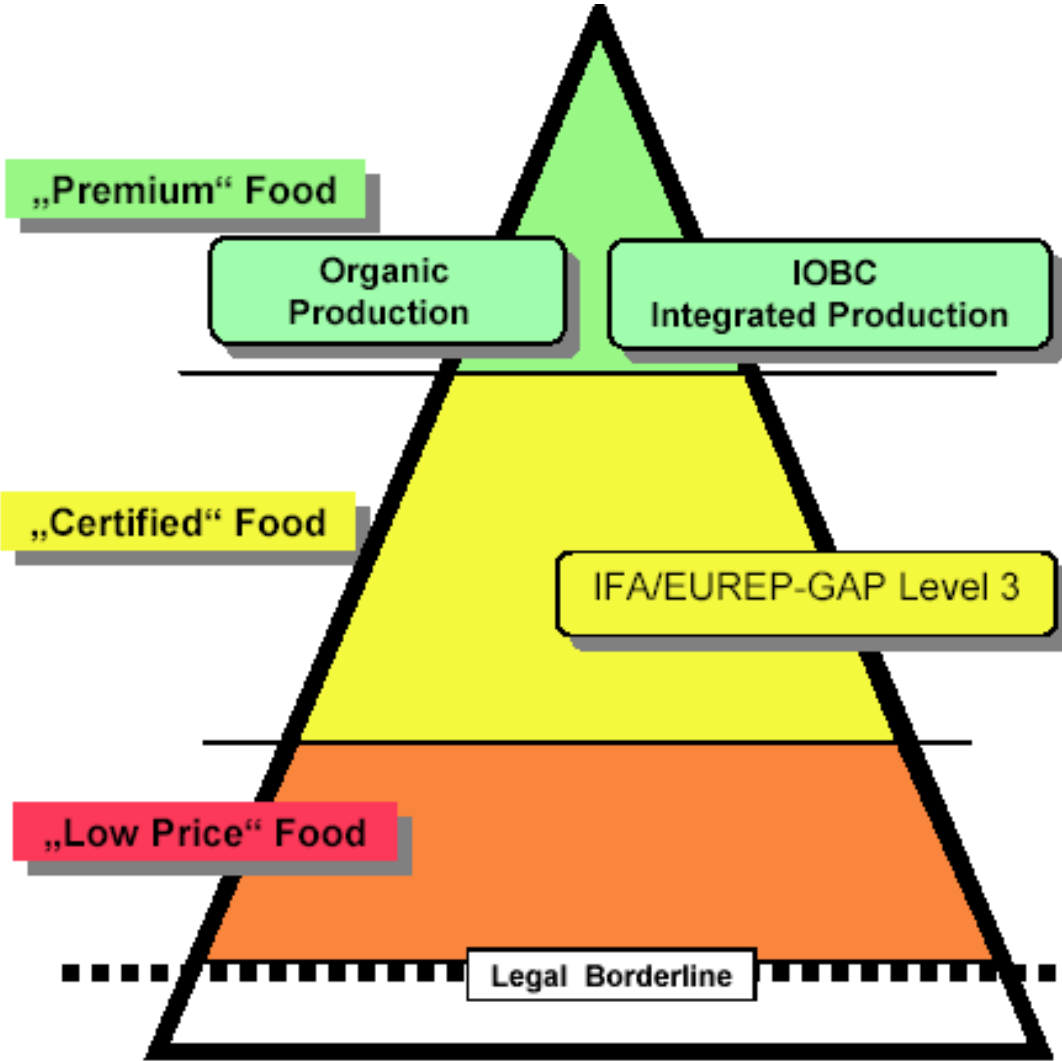
IP produces high quality food ...



- Internal Product Quality
- Ecological Quality
- Ethical Quality
- Social Quality

PRODUCT TOTAL QUALITY

The position of the IOBC standards in the quality pyramid



THE TOOLBOX

Tools to facilitate the implementation on IP by growers organizations

- **How to prepare the documents**
- **Book on Ecological Infrastructures**
- **Green and Yellow lists of control measures**
- **Database on Pesticide selectivity to natural enemies**
- **SESAME: Software for inspection**



Ecological Infrastructures

Ideabook on Functional Biodiversity
at the Farm Level

Ökologische Infrastrukturen

Ideenbuch zur funktionalen Biodiversität
auf Betriebsebene

Ernst F. Boller, Fritz Häni & Hans-Michael Poehling (Eds.)

FLOWERING PLANTS

Einige für Nützlinge wichtige Pflanzeigenschaften (Legende unten)

Selected plant characteristics of interest for Conservation Biological Control (footnotes below)

Wildpflanze Plant species	Deutsch	English	Bemerkungen Remarks	A	B	C	D	E
<i>Achillea millefolium</i>	Schafgarbe	Yarrow	Coccinellidae, Syrphidae	3+	**			
<i>Agrostemma githago</i>	Kornrade	Common corncockle	Repellent?	1	*/**		G24	
<i>Ajuga reptans</i>	Kriechender Günsel	Bugleweed		3+	*			
<i>Anchusa arvensis</i>	Acker-Krummhals	Bugloss		1	**			
<i>Anethum graveolens</i>	Dill	Dill	Syrphidae,	1	**			
<i>Anthyllis vulneraria</i>	Gemeiner Wundklee	Kidney-vetch		2	**			
<i>Anthemis tinctoria</i>	Färberkamille	Golden chamomile		3+	**			
<i>Borago officinalis</i>	Borretsch	Borage	Chrysopidae, «selective»	1	**	G30		
<i>Buglossoides arvensis</i>	Acker-Steinsame	Corn gromwell		3+	*/**			
<i>Camelina sativa</i>	Saat-Dotter	Gold of pleasure		1	**			
<i>Campanula patula</i>	Wiesen-Glockenblume	Bellflower		3+	**/**			

A: Lifespan B: Flowering period

C: Source of nectar

D: Diversity of the Fauna

E: Overwintering refugia

Boller et al. (2004)

THE GREEN AND YELLOW LISTS

- Usually a list of agrochemicals “permitted” and “permitted with restrictions”
- The indirect plant protection measures are not clearly identified and are usually scattered over different chapters
- The green list can be a tool to state all the elements of the plant protection program
- Green and yellow lists of plant protection measures

THE GREEN LIST

Should address the relevant indirect and direct plant protection measures:

- **Choice of cultivars, protection of old and establishment of new ecological infrastructures, ..**
- **Use of fertilizers, habitat-management, use of key antagonists, ..**
- **Use of monitoring tools**
- **Direct plant protection (control): Restrictive list of highly selective control procedures**

THE YELLOW LIST

Should complement the green list with a restrictive list of second choice plant protection measures – mostly pesticides – that exhibit minor negative side-effects

- The plant protection measures listed in the yellow list can be applied only if the green list does not provide adequate results**
- The yellow list must provide complete information and precise indications against what target and under which circumstances the product can be used**

PESTICIDE SELECTIVITY

IOBCwprs Working Group "Pesticides and Beneficial Organisms & IOBCwprs Commission "IP Guidelines and Endorsement" (05.12.2005 Comm.)	Type	Formulation	Concentration tested	Grams a.i./ha	Classification of side effects to beneficial organisms																WHO toxicity class	
					N = harmless or slightly harmful (Reduction field, semi-field 0-50%, lab 0-30%) M = moderately harmful (Reduction field, semi-field 50-75%, lab 30-75%) T = harmful (Reduction field, semi-field > 75%, lab >80%) Normal black entries = laboratory data (IOBC) Bold black face = semi-field test data (IOBC) Asterix * marked black entries = Field test data (IOBC) Red = additions by Commission (expert judgments), final classification pending Pink marked data = data added by Commission (expert judgments)																	
Active ingredient	I = Insecticide F = Fungicide A = Acaricide H = Herbicide PGR = Plant Growth Regulator				Code number of beneficial organism																Coding key see appendix	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
					Predatory mites (Typhlodromus pyti)	Predatory mites (Phytoseiulus persimilis)	Spiders (Parotia sp.p.)	Spiders (Chelacanthium mibeli)	Flower bugs (Anthrenorhynchus nemoralis)	Flower bugs (Cortus laevigatus)	Lacewings (Chrysoperla carnea)	Ladybird beetles (Coccinella 7-punctata)	Rove beetles (Aleochara bilineata)	Ground beetles (Poecilus cupreus)	Parasitoids (Aphidius incapsulipit)	Parasitoids (Tricogramma cacoeciae)	Hoverflies (Syrphus corollae)	Toxicity to bees	Toxicity to earthworms (Eisenia foetida)	Fish Toxicity		
Abamectine	A	18 EC		13.5	N-T	T				T	N	N			T	T		-	+	(II)		
Amitraz	A	200 g/L	0.3	360	T*	T			M		M	T	T		T	T		-	-	+	III	
Azadirachtine	A	1% T/S		30	N	T			T	N	N*	N		N	M	T	M		-	-	-	(U)
Azocycloth	A	25 WP	0.1			N					T				T	T				+	II	
Benzoximate	A	200 g/L	0.15			N					M				M	T				+	0	
Bromopropylat	A				M				N		N				N	N				+	U	
Clofentazine	A	500g/L	0.04		N*	N		N	N*		N	N	N		N	N	N			-	-	U
Cyhexatin	A				N-M				N						T	T				+	(III)	
Diafenthiuron	A	250 SC		500	N*	T				T	M	N			M	T				+	U	
Etoxazol	A				M						M				N	N				+	(U)	
Fenazaquin	A				M				M											+	(III)	
Fenitrothion	A	550 g/L	0.1	330	T	T			T		T	T	T		T				+		II	
Fenpropathrin	A	10 WP		300	T	T		T	T		M	N	T		T					+	II	
Fenpyroximate	A	50 EC		50	N-M	T			N-M	N	N	T	N	N	T	M				-	+	(III)

SELECTIVITY OF PESTICIDES

<p>IOBCwprs Working Group "Pesticides and Beneficial Organisms & IOBCwprs Commission "IP Guidelines and Endorsement" (05.12.2005 Comm.)</p>	<p>Type</p>	<p>Formulation</p>	<p>Concentration tested</p>	<p>Grams a.i / ha</p>
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Classification of side effects to beneficial organisms

N = harmless or slightly harmful (Reduction field, semi-field 0-50%, lab 0-30%)

M = moderately harmful (Reduction field, semi-field 50-75%, lab 30-79%)

T = harmful (Reduction field, semi-field > 75%, lab >80%)

Normal black entries = laboratory data (IOBC)

Bold black face = semi-field test data (IOBC)

Asterix * marked black entries = Field test data (IOBC)

Red = additions by Commission (expert judgments), final classification pending

Pink marked data = data added by Commission (expert judgments)

SESAME

- **Software developed in 2005**
- **Implementation of the guidelines at the inspection level**
- **List of 50 items**
- **Display of the degree of success**
- **Tested in 2006 and 2007 under fully application in 2008**

SESAME

30.11.05

Name of Organisation:

Checklist (Farm inspection protocol) 2006 of IOBC Standard for Integrated Production

All crops and crop specific aspects for

Grapes
(vinification)

1. Index of major inspected areas

Major control aspects	Control areas	IOBC Guideline II Chapter no.
Farm management aspects	Farm records, self-inspection, training	1
	Traceability	1
Agronomic and environmental aspects	Biodiversity, ecological infrastructures	2
	Site selection	3
	Site management	4
	Varieties, rootstock, cultivation systems	5
	Plant nutrition, fertilizer usage	6
	Irrigation	7
	Crop Protection	8
	Waste disposal and recycling	8,7
Livestock density	11,1	
Food safety aspects	Harvesting	9
	Postharvest (Produce Handling)	10
Social aspects	Worker health, safety, welfare	12
	ILO Charta: Minimal wages, child work	
Ethical aspects	Animal welfare	11,2



SESAME

Major control aspects	Control areas	IOBC Guideline II Chapter no.
Farm management aspects	Farm records, self-inspection, training	1
	Traceability	1
Agronomic and environmental aspects	Biodiversity, ecological infrastructures	2
	Site selection	3
	Site management	4
	Varieties, rootstock, cultivation systems	5
	Plant nutrition, fertilizer usage	6
	Irrigation	7
	Crop Protection	8
	Waste disposal and recycling	8,7
	Livestock density	11,1

SESAME

10/11/2006

Checklist (Farm inspection protocol) 2006 of IOBC Standard for Integrated Production 3. Control points to be verified by inspection body

Frequency 0 (not assessed)	Bonus		
	+1	+2	+3

1. Farm records, self-inspection, training and traceability				
1.1	Records complete, available at inspection and kept for 3 years			
1.2	Self-evaluation (internal audit) made, documented and available at inspection			
1.3	Corrective action taken based on results of inspection			
1.4	Participation in annual training courses approved by organisation			
1.5	Traceability for products at farm level			
2. Biodiversity, ecological infrastructures				
2.1	At least 5% of farm surface identified and managed as ecological infrastructures			
2.2	At least 2 ecological options for active enhancement of biodiversity fulfilled			
	Read more: IOBC list of options for Ecological infrastructures			
2.3	Adequate buffer zones between crop areas and sensitive off-crop areas established			
3. Site selection				
3.1	Every field suitable for sustainable production and clearly identifiable			
3.2	In new cultivation sites an adequate risk assessment made, documented and corrective plan established			
4. Site management				
4.1	Annual crops: Crop rotation requirements fulfilled			
4.2	Perennial crops: Alleyway/intertree strip management fulfills specified requirements			
4.3	Soil fertility and protection by adequate measures			
4.4	Chemical fumigation/disinfection prohibited			
5. Varieties, rootstock, sowing/planting aspects				
5.1	Adequate choice of cultivars			
5.2	Adequate quality and health status			
5.3	Use of GMOs according to guidelines			
5.4	Cultivation: crop specific requirements observed			
6. Plant nutrition and fertilizer use				
6.1	Soil analyses data adequate, not older than prescribed interval			
6.2	Fertilization plan based on rules established for each crop (and entire crop rotation)			
6.3	Measures to reduce nutrient loss are followed			
6.4	Nitrogen supply and timing applied according to fertilization plan			
6.5	Other major nutrients (especially P and K) applied according to fertilization plan			
6.6	Storage conditions and handling of fertilizers fulfill basic requirements of GAP			
6.7	Restrictions of using human sewage sludge strictly observed			
6.8	Organic materials with only technically lowest possible load of heavy metals			
7. Irrigation				
7.1	Water requirements of crops adequately taken into account and irrigation plan established for each plot			
7.2	Irrigation methods used are adequate			
7.3	Water quality is adequate			
7.4	Water supply is optimised			
8. Integrated plant (crop) protection				
Green and yellow lists, monitoring, choice of pesticides and records				
8.1	Application of the Green list			
8.2	The pests have been recorded properly and tolerance level for each key pest is known			
8.3	Pesticides used are exclusively those listed in the green and yellow list of the organisation and restrictions observed			
8.4	Records of pesticide applications are complete			
8.5	Preharvest intervals of pesticide applications and MRL values respected, residue analyses made			
Efficient and safe handling, storage and application of pesticides				
8.6	Pesticide storage conditions and handling are adequate and fulfilling GAP standards			
8.7	The spray equipment is properly chosen and maintained			
8.8	The disposal of surplus mix, obsolete pesticides and empty containers fulfills GAP requirements			
9. Harvesting				
9.1	Hygiene measures of workers are documented, meet standards and are applied			
9.2	Hygiene measures of packaging are documented, meet standards and are applied			
10. Postharvest (Produce Handling)				
10.1	Hygiene measures are documented, meet standards and are applied			
10.2	Postharvest washing procedures are documented, meet standards and are applied			
10.3	Postharvest treatments are specified and documented			
10.4	On farm facilities for produce handling and/or storage meet standards			
11. Animal density and welfare on mixed farms with livestock				
11.1	Livestock density does not exceed 2.0 LU/ha or delivery contracts for excess manure exist where density is higher			
11.2	Animal welfare on mixed farms observe the rules described section 11.2 of IOBC guideline II (2004)			
CROPS only		Total score possible		
		Total score achieved		
		% achieved (minimum target for bonus points XX%)		
CROPS + LIVESTOCK		Total score possible		
		Total score achieved		
		% achieved (minimum target for bonus points XX%)		




■ Major MUST-item: To be included in all IOBC endorsed check-lists. Content and interpretation on respective text sheet ("rucksack"). Fulfillment of all major MUST items is mandatory.
■ Minor MUST-item: To be included in all IOBC endorsed check-lists. Content and interpretation on respective text sheet ("rucksack"). At least 90% of minor MUST items must be fulfilled
■ Bonus Points: A minimum target number of bonus points must be defined by IOBC-endorsed growers' organisation.

Date Signature of farmer



Signature of inspector

SESAME

2. Biodiversity, ecological infrastructures

-  2.1 At least 5% of farm surface identified and managed as ecological infrastructures
-  2.2 At least 2 ecological options for active enhancement of biodiversity fulfilled
Read more: IOBC list of options for Ecological infrastructures
-  2.3 Adequate buffer zones between crop areas and sensitive off-crop areas established

3. Site selection

-  3.1 Every field suitable for sustainable production and clearly identifiable
-  3.2 In new cultivation sites an adequate risk assessment made, documented and corrective plan established

SESAME

IOBC Commission on IP Guidelines and Endorsement (27.11.05)

Selected list of "Rucksack" items

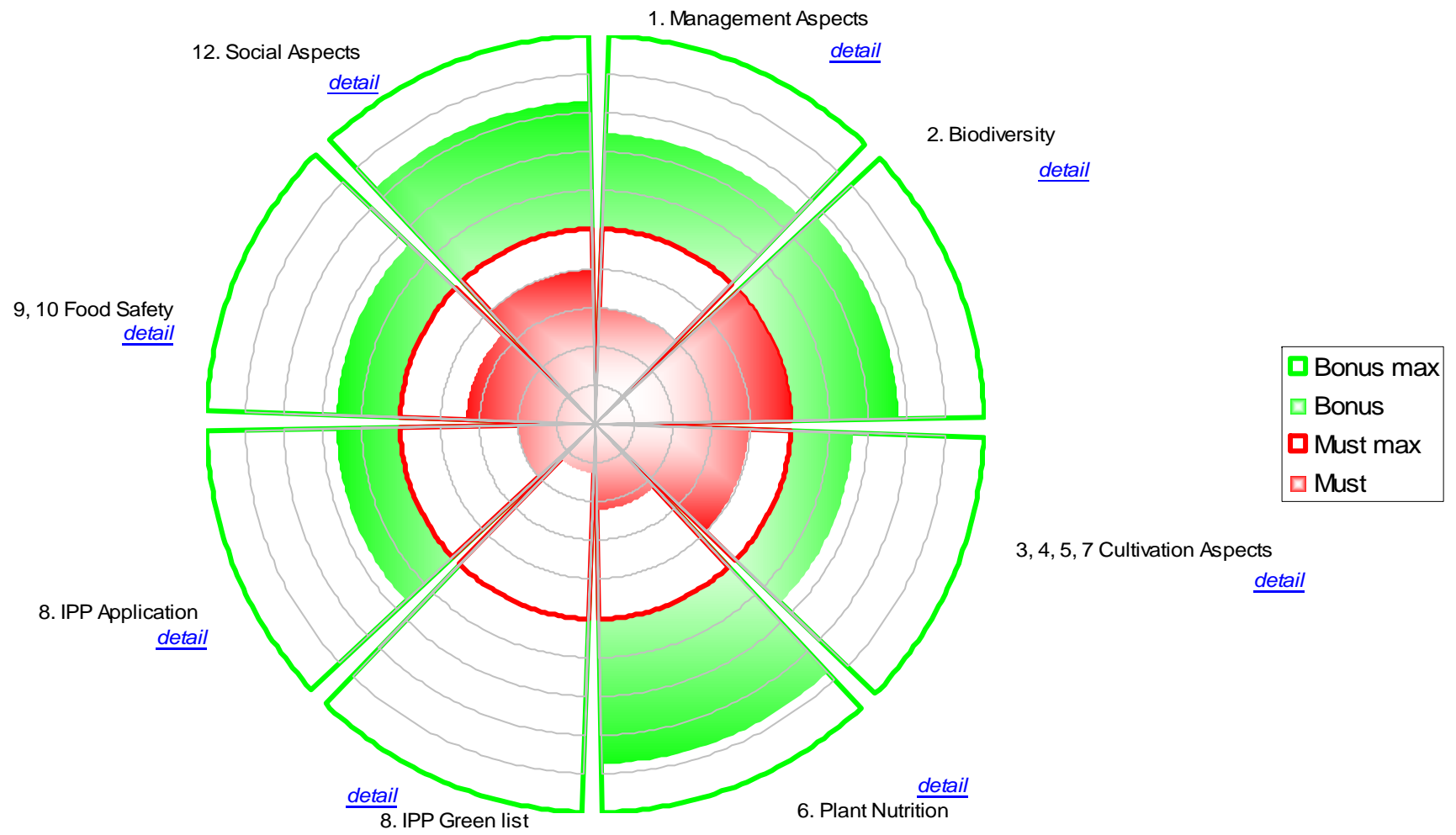
Control points marked with an * do not require IOBC inspection if organisation is EUREP-GAP certified. Control points marked with ** do not apply to processed products (e.g. grapes for vinification, olives for oil production). Red texts have been taken from inspection protocols of international food safety standard and should not be altered.

* Asterix

- | 1.1 | Farm Records |
|-------|---|
| 1.1.1 | All applications of fertilizers giving date, plot, commercial name and quantity |
| 1.1.2 | All applications of plant protection measures with date, plot and type |
| 1.1.3 | All pesticide applications with date, plot, commercial name and quantity |
| 1.1.4 | Other mandatory records in the organisation's farm record protocol are complete and true. |
| 1.1.5 | Recordings on key pest occurrence (e.g. flight curves, spidermite densities) taken |
| 1.1.6 | Farm records kept for 3 years |
| 1.1.7 | Total amount of NPK applied per ha per plot and crop documented and calculated properly |

SESAME

Farm performance of IOBC Standard for Integrated Production



List of endorsed organisations

ORGANISATION AND ADDRESS	LABEL	YEAR OF IOBC ENDORSEMENT	ENDORSED PRODUCTION
	TRADEMARK		
TRECOOP - Llerida - SPAIN	TRECOOP FRUITES	1998 - 2009	Pome fruits
TYFLO – Obernai - FRANCE	TYFLO	2000 -2009	Grapes & wine
LIVE - Salem - Oregon USA	LIVE	2001-2009	Grapes & wine
APOFRUIT- Cesena - Italy	ALMAVERDE	1998-2007 (presently not endorsed)	Stone fruits

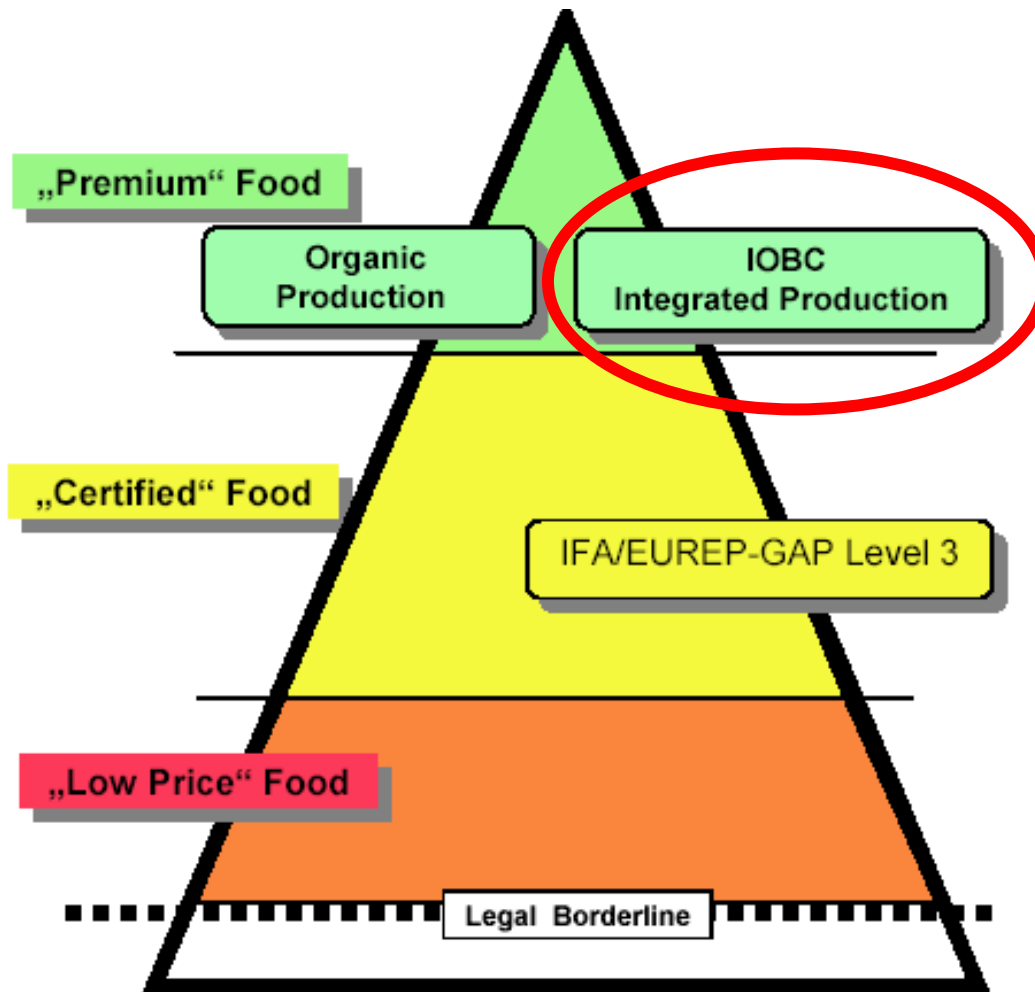
POSSIBLE IMPLEMENTATION OF IPM/IP AFTER 2013

REQUIREMENTS/OBBLIGATIONS			FUNDING
IPM – pesticide treatment justification	Guidelines application at farm level	Respect of thresholds	Mandatory - no funding
	Advisory services	Availability meteo data	
		Availability/respect of official forecasting models	
		Availability/respect of official bulletins	
Spraying equipment checking and calibration	Mandatory each 5 years by officially recognised bodies		
CROSS - COMPLIAN CE	Application of Directive 414 and other mandatory national laws		

POSSIBLE IMPLEMENTATION OF IPM/IP AFTER 2013

REQUIREMENTS/OBLIGATIONS			FUNDING
Integrated production	Crop rotation		payment through agro-environmental measures (Reg 1698) or Environmental strategy CMO F&V (Reg 1234) from 50-450 Euro/ha/year or future art. 68 CAP**
	Irrigation	Irrigation plan based on ETP and soil condition	
	Soil protection		
	Fertilisers reduction	Fertilisation plan based on uptake and soil availability of macro elements (N, P K)	
IPM – pesticide selection 2nd step	Use of only Bio product (Bt, viruses.), mating disruption, ecc.		
IPM – pesticide selection 1 st step	Exclusion of more dangerous or not selective active ingredients	Exclusion or strong reduction of R 40 or R48 or R60-63 or R68 pesticides phrases R	

IOBC will pursue the policy of maintaining high standards and to assist motivated farmers to develop their sustainable farming systems



**Many thanks
for your attention**

