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ORGANIC INPUTS EVALUATION

Volume 1

Current Evaluation Procedures for Plant Protection Products Used in Organic Agriculture

Proceedings of a workshop held September 25–26, 2003 in Frick, Switzerland

Edited by Bernhard Speiser and Otto Schmid

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Participants of the workshop held September 25–26, 2003

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Table of Contents

List of abbreviations

EC 2092/91	European Council Regulation 2092/91 on organic agriculture, including all subsequent amendments
F&SC	fertilizers and soil conditioners
I&C	inspection and certification
Inputs	In this volume: PPP and F&SC
OA	organic agriculture
OF	organic farming
PPP	plant protection product(s)

Foreword

This volume contains a number of articles on evaluation procedures for plant protection products used in organic agriculture. They describe the current situation in different European countries and the USA, and summarize the evaluation procedures in the guidelines for organic food in Codex Alimentarius and in the Basic Standards of the International Federation of Organic Agriculture Movements. These articles are based on presentations made at the workshop "Inventory of existing procedures for evaluation of plant protection products used in organic agriculture", held on September 25–26, 2003 in Frick, Switzerland. The aim of the workshop was to give an overview of different evaluation systems, and of their interaction with general (i.e. non-organic) legislation on pesticides. The workshop was part of the European Union (EU) Concerted Action project 'ORGANIC INPUTS EVALUATION', described at the end of this volume.

The range of available plant protection products, fertilizers and soil conditioners (referred to in this volume as 'inputs') strongly affects quantitative yield, yield security, quality of produce and profitability of crops. It may also affect the environment and the public perception of organic and non-organic farming systems. Thus, the use or non-use of inputs is an important element of agricultural production systems from the point of view of farmers, consumers and policymakers. Organic farming is characterized by a strict regulation of plant protection products, fertilizers and soil conditioners, which precludes the use of the vast majority of all available compounds.

At European level, Council Regulation 2092/91 lists all inputs allowed in organic farming. However, the particular inputs allowed on a national level can vary quite considerably from country to country. There are two reasons for this heterogeneity: (i) in addition to EC 2092/91, inputs also have to comply with national legislation. In the case of plant protection products (PPP), the most important bottleneck is pesticide registration on a national level; (ii) certain aspects of EC 2092/91 are interpreted in different ways in the EU Member States.

The collection of country reports in this volume allows a comparison of the situation in a number of countries, mostly in Europe. This shows the degree of equivalence between countries, and indicates the causes of the heterogeneity found. The aim of this collection was not to give a complete picture of all similarities and dissimilarities for the whole of Europe, but to highlight the general patterns, and to identify the reasons for the major differences between countries. Finally, it should be kept in mind that input evaluation takes place in a constantly changing environment of regulations and private standards. The articles therefore describe the situation at the time when the workshop was held.

The present collection of reports, all written to a common structure, is unique, and we would like to thank all authors for their contributions, and the Commission of the European Communities for financial support. We hope that this volume will further efforts to create a more level playing field regarding the selection of inputs that European organic farmers are permitted to use.

Frick, Switzerland, April 2004

Bernhard Speiser and Otto Schmid

Summary

***Bernhard Speiser and Otto Schmid*[1]**

Scope of this collection of reports

The reports in this volume give an overview of the current use of plant protection products in organic agriculture, as well as of the regulatory framework and the procedures and criteria for evaluation of these products, together with some background information. The reports describe the situation in the following EU Member States: Austria (AT), Denmark (DK), France (FR), Germany (DE), Italy (IT), The Netherlands (NL), Portugal (PT), Spain (SP) and the United Kingdom (UK). In addition, the volume covers Poland (POL; accession country at the time of the workshop), Slovenia (SLO; accession country at the time of the workshop), Switzerland (CH; recognized as a third country) and the United States of America (USA). Finally it describes the procedures and criteria used by the International Federation of Organic Agriculture Movements (IFOAM) in its 'Basic Standards', and those used by Codex Alimentarius in the 'Guidelines for the Production, Processing, Marketing and Labelling of Organically Produced Food'.

Regulatory framework

In all these countries, plant protection products (PPP) must conform to two kinds of regulations:

- Regulations for organic agriculture
- Legislation on pesticides

Only those compounds which comply with *both* sets of legislation can be used in any given country.

Regulations for organic agriculture

Organic farming can be regulated at three levels: European, national and private.

For EU Member States, Council Regulation 2092/91 defines the maximum range of PPP which can be used in organic agriculture. In addition, some countries also have national legislation on organic farming (e.g. AT, DK, SP, UK), and there are various private standards. In most cases, however, national legislation and private standards do not further restrict the range of PPP allowed in organic farming (except for the case of copper fungicides).

Countries which are not EU Member States have national legislation on organic farming. For the accession countries Poland and Slovenia, this is an identical transcript of EC 2092/91 (except that SLO has a lower limit for copper use than the EU regulation 2092/91). The Swiss Organic Farming Ordinance allows a similar range of inputs as EC 2092/91, but lacks a number of compounds which are not relevant for Switzerland, and restricts the use of copper more tightly than EC 2092/91. The 'National Organic Program' of the United States has a different approach than European regulations: Natural compounds are generally allowed unless they are explicitly prohibited, and synthetic compounds are generally prohibited unless they are explicitly allowed.

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Pesticide legislation

At present, all countries have their own legislation on pesticides and require registration of pesticides at national level. This applies to all pesticides, not just those for organic agriculture. The standard registration procedures are similar in most countries. However a number of countries have simplified procedures for low-risk products. Examples are:

- NL: 'RUB' registration for low-risk compounds;
- IT: simplified procedure for commercialization of certain compounds used in organic farming;
- PT: exemption from registration costs for compounds used in organic agriculture only;
- DE: notification for 'plant strengtheners' & exemption from registration requirements for substances on the 'self-cooking list'. According to the official interpretation, products listed as plant strengtheners in DE are neither PPP nor fertilizers, and are therefore allowed in organic farming without having to be listed in Annex II A or B of EC 2092/91.

There are great disparities as to which of the compounds permitted by EC 2092/91 are actually registered in the different countries. There are several reasons for this: (i) the industry may or may not apply for registration. This depends on the importance of crops, pests and diseases, and on the market share of organic farming, all of which determine the potential sales of a particular input; (ii) simplified procedures for registration may or may not be available, and criteria may be implemented with variable stringency, thus leading to variable registration costs.

Regulation of commercial products

From the list of pesticides registered for a given country, products are allowed for organic farming provided that the active substance is listed in EC 2092/91, Annex II B. As this requires no further decision making, competent authorities in the Member States are referring to Annex II B ensuring that in their countries only allowed products are used. In some cases, national or regional authorities or certification bodies have prepared lists of allowed products (e.g. DE, FR, PT, SP). In most cases, these are only guidance documents which are updated with varying frequency, and the responsibility lies with the farmer. In Austria and Slovenia, annually updated lists of allowed inputs are available.

Some countries have additional criteria for evaluation of PPP: in DK, evaluation covered not only the active substance but also the other ingredients, until recently. However, this procedure might be changed in the future. Decisions were taken by the Danish Plant Directorate, a government institution. In the USA, an inputs list is produced annually by a specialized body, the Organic Materials Review Institute (OMRI). Additional criteria are applied such as evaluation of the entire product composition. Decisions are taken by a public institution, the National Organic Standards Board. In Switzerland, an inputs list is produced annually for the largest private label organization BIO SUISSE, to which almost all Swiss organic farmers belong. Criteria for inclusion in this list are stricter and include an evaluation of the entire product composition, as well as strict evaluation of necessity, environmental impact, socio-economic acceptability and ethical aspects. Dossiers are prepared by the Research Institute of Organic Agriculture, and decisions are taken by BIO SUISSE.

Major discussion points

A review of the major discussion points in the different countries reveals a considerable heterogeneity of concerns. The most frequent issues are:

- The bottleneck for the use or non-use of compounds (active ingredients) is often the official pesticide registration in the country. Whether commercial products containing a given active ingredient are registered depends on the industry and the registration authorities, but the organic sector has little influence on it. To overcome this, modifications of the registration procedures are being discussed in several countries.
- Many of the PPP allowed for organic agriculture are subject to re-evaluation under directive EC 91/414. If they failed this re-evaluation, the range of allowed compounds might be reduced substantially. At present (April 2004), most of the compounds have been notified, but the exact evaluation criteria have not yet been decided and their impact cannot be foreseen yet.
- Organic farmers in several countries feel discriminated against because they do not have access to compounds that can be used in other countries.
- The use of copper fungicides is perceived as undesirable in organic farming. As a corollary, producers in some countries fear that they might be deprived of copper fungicides before efficient alternatives are available.
- Many organizations believe that inert ingredients of PPP should also comply with organic farming regulations. However, there are no generally accepted evaluation criteria, and most of the institutions regulating organic farming have no insight into the composition of PPP.

Use of compounds in different countries

Here, we summarize the use of different compounds across Europe. This overview is based on the country reports in this publication, but information was not complete for all countries. In most cases where a compound is not allowed in a country, this is because no commercial product is registered.

Products of plant or animal origin

- *Azadirachtin*
  According to EC 2092/91, azadirachtin (an extract of the neem tree) may be used if the need is recognized by the inspection body or authority. Under this restriction, its use is allowed in AT, IT, NL, SP, CH and UK, but not in DK, PT and SLO. In the UK, some private standard setting organizations allow its use with prior permission, while others do not.
- *Pyrethrins*
  According to EC 2092/91, pyrethrins may be used if the need is recognized by the inspection body or authority. Their use is allowed in all countries investigated. In NL, the use is not allowed in apple, pear and stone fruit production.
- *Quassia*
  Quassia is allowed in AT, IT, SP, CH and UK, but not in DK, NL, PT, SLO. In the UK, some private standard-setting organizations allow its use, while others do not.
- *Rotenone*
  According to EC 2092/91, rotenone may be used if the need is recognized by the inspection body or authority. Under this restriction, its use is allowed in AT, IT, SP, CH and UK, but not in DK, NL, PT

and SLO. In the UK, some private standard-setting organizations allow its use with prior permission, while others do not.

- *Lecithin*
  Lecithin is allowed in all countries investigated except DK and SLO.
- *Plant oils*
  Plant oils are allowed in all countries investigated except DK.
- *Soft soap*
  Soft soap is allowed in all countries investigated except PT.

Products of mineral origin

- *Potassium alum (kalinite)*
  According to EC 2092/91, potassium alum is allowed only for bananas. With this restriction, it is allowed in AT, IT, SLO and SP.
- *Mineral oils*
  According to EC 2092/91, mineral oils are allowed only for fruit and olive trees, vines and tropical crops. With this restriction, their use is allowed in AT, IT, NL, PT, SLO, SP and CH.
- *Quartz sand*
  Quartz sand is allowed in all countries investigated except PT and CH.
- *Sulphur*
  Sulphur is allowed in all countries investigated.
- *Others*
  Rock powder and silicates are allowed in NL, clay minerals in CH. In DE, clay minerals are notified as plant strengtheners and therefore allowed.

Products of microbial origin

- *Bacillus thuringiensis*
  B. thuringiensis is allowed in all countries investigated.
- *Granulosis viruses*
  Granulosis viruses are allowed in all countries investigated except DK and PT.
- *Others*
  According to EC 2092/91, all microorganisms are allowed provided that they are not genetically modified. In different countries, different microorganisms are registered against different pests or diseases. In CH, the microbial fermentation product spinosad is allowed.

Products of diverse origin

- *Diammonium phosphate*
  According to EC 2092/91, diammonium phosphate is allowed only in traps. It is allowed in AT, IT, SLO and UK.
- *Metaldehyde*
  According to EC 2092/91, metaldehyde is allowed only in traps, and only until 2006. It is allowed in AT, IT, NL, PT, SLO, SP and UK.
- *Pheromones*
  According to EC 2092/91, pheromones are allowed only in traps. They are allowed in all countries investigated except DK.
- *Pyrethroids*
  According to EC 2092/91, only the pyrethroids deltamethrine and lambda-cyhalothrine are allowed, and their use is restricted to traps for the control of *Batrocera* and *Ceratitis*. The use of these products is allowed in AT, IT, SLO, SP and UK.
- *Iron phosphate*
  Iron (III) phosphate is allowed in AT, DE, IT, NL, SLO and SP. In CH, it is allowed by national legislation, but the commercial product is not included in the FiBL inputs list. Thus, it cannot be used by the majority of Swiss organic farmers.
- *Copper*
  According to EC 2092/91, copper fungicides may be used if the need is recognized by the inspection body or authority. The application is limited to 8 kg/ha/year until 2006, and 6 kg/ha/year after that (with more complicated regulations for perennial crops). With these restrictions, copper fungicides are allowed in AT, DE, FR, IT, PT, SP and UK. In CH, their use is limited to 4 kg/ha/year (less in some crops) and in SLO to 3 kg/ha/year. In DK and NL, copper is not allowed.
- *Lime sulphur*
  According to EC 2092/91, lime sulphur may be used if the need is recognized by the inspection body or authority. With this restriction, it is allowed in AT, IT, SLO, SP, and UK. In NL, it was exceptionally allowed in 2003 for apples and pears.
- *Paraffin oil*
  Paraffin oil is allowed in all countries investigated except PT.
- *Potassium permanganate*
  According to EC 2092/91, potassium permanganate may be used in fruit and olive trees and vines only. With this restriction, it is allowed in AT, IT, SLO, SP and UK.

Plant protection products in organic farming in Austria

Alexandra Hozzank[2]

History, structure and trends of organic farming in Austria

History

The organic movement in Austria originated in 1980, when 200 farmers decided to cultivate their farms according to organic methods. The movement's strongest period of growth was up to the end of the nineties; in 1999 it reached its peak with 19 733 farms. The most important factors for this enormous increase had been the early inclusion of guidelines for organic crop production and animal husbandry in the Austrian Codex Alimentarius (not to be confounded with the international Codex Alimentarius of FAO/WHO), government support for organic farms during and after conversion through compensatory payments, favourable market conditions through the entrance of supermarket chains, and the active policy of the organic farming associations (mainly BIO ERNTE AUSTRIA, with a share of nearly 65 % of all organic farmers). After this peak the number of organic farms decreased again until 2001. From 2001 to 2002, the number of organic farms in Austria increased from 17 512 to 17 891. In 2002, 17 891 organic farmers were cultivating 12 % of the agriculturally used area (BMLFUW, 2003a).

Structure and trends

Austria is characterized by small-structured agriculture, the average farm size being between 10 and 20 ha.

Cereal production is of highest importance, followed by feed production – 43 % cereal production, 31 % feed crop production, 7 % legumes, 5 % maize, about 2 % potatoes and 2 % oil seed (Eder *et al.*, 2002). In animal husbandry the distribution is as follows: 18 % of cattle, 1 % of pigs, 2 % of chickens, 24 % of sheep and 14 % of horses are kept according to organic standards (Freyer *et al.*, 2001). In 2001, an 'Action Plan for Organic Agriculture in Austria' was developed. This plan is scheduled to increase the organically managed area to 50 % by 2006 (BMLFUW, 2003b).

Support

Financial support for organic agriculture by the state started in 1989. Since 1995, one year after Austria entered the European Union, organic agriculture has been funded through the framework of ÖPUL, the Austrian Agri-Environmental Programme (BMLFUW, 2000).

Inspection

There are seven accredited certification bodies operating in Austria, which are either private non-profit or for-profit organizations. The supervision of the control and certification process is characterized by a tripartite approach (Federal Ministry of Social Security; Federal Ministry for Economic Affairs and Labour; Federal Ministry for Agriculture, Environment and Water Management), where each ministry focuses on a specific agenda (Darnhofer *et al.*, 2003).

2 Infoxgen – Arbeitsgemeinschaft transparente Nahrungsmittel, Königsbrunnerstraße 8, A-2202 Enzersfeld

Major inputs (in descending order)

- Copper, sulphur (decreasing quantities)
- *Bacillus thuringiensis*
- Granulosis viruses
- Fatty acid potassium salt
- Lime sulphur (only used in 2003, with an exceptional authorization)

Regulatory framework

Organic agriculture in Austria is mainly regulated through the EU Regulation 2092/91. In addition, guidelines for organic production are implemented in the Austrian Codex Alimentarius. On the national level, PPP and F&SC are regulated by the laws mentioned below. There is also the possibility of applying for an exceptional authorization for components not listed in Annex B. This can be considered when special circumstances threaten crop production. For example, an exceptional authorization for lime sulphur against powdery mildew and scab on apples and pears was given in 2003.

Legislation on PPP and F&SC

- Codex Alimentarius Austriacus, Chapter A8, Subchapter A

Legislation on PPP

- Plant Protection Products Act (Pflanzenschutzmittelgesetz) 1997
- Ordinance giving parity with Germany (109. Verordnung: Verordnung gemäß §12 Abs. 9 Pflanzenschutzmittelgesetz 1997 – Gleichstellungsverordnung Bundesrepublik Deutschland)
- Ordinance giving parity with the Netherlands (52. Verordnung: Verordnung des Bundesministers für Land- und Fortswirtschaft, Umwelt und Wasserwirtschaft gemäß §12 Abs. 9 des Pflanzenschutzmittelgesetzes 1997 – Gleichstellungsverordnung Königreich der Niederlande)
- Agricultural Law Amendment Act 2003 (110. Bundesgesetz: Agrarrechtsänderungsgesetz)

Legislation on F&SC

- Fertilizer Regulation (Düngemittelverordnung) 2004.
- Compost Ordinance 2001 (Verordnung des Bundesministers für Land- und Fortswirtschaft, Umwelt und Wasserwirtschaft über Qualitätsanforderungen an Komposte aus Abfällen – Kompostverordnung)

Private Standards

- Production Guidelines of BIO ERNTE AUSTRIA (published annually)
- Infoxgen Input List (published annually)

Hot issues

- Evaluation of products restricted to active substances
- Lack of lists for problematic inerts
- GMO problem concerning active ingredients as well as inerts
- Restricted resources for information transfer
- Plant strengtheners: through the amendment of the Austrian Fertilisers Regulation at the beginning of 2004 plant strengtheners registered in Germany (BBA list) are treated as plant conditioners and are allowed for use in organic agriculture in Austria without previous evaluation.
- 'Self-cooking list': sticking to the existing legislation, it is not possible to use self-produced plant extracts. As soon as a product is applied against any kind of pest organisms, it has to be registered as plant protection product.
- There are no institutions in Austria checking products with reference to necessity and effectiveness.

Decision making

PPP have to be registered with the Agency for Health and Nutrition Security (AGES). There the branded products are evaluated taking the active ingredients into consideration, apart from the required studies on ecotoxicity and human toxicity.

The evaluated products are published on the AGES homepage http://www.lwvie.ages.at/service/pflanzenschutz/pfschreg/index.html, where PPP for organic agriculture are listed in a separate category http://www.lwvie.ages.at/service/biolandbau/index.html.

The evaluation of products on the level of private standards (BIO ERNTE AUSTRIA) is taken into account during the composition of the input list, which is published annually by the database *Infoxgen* http://www.infoxgen.com.

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Plant protection products in organic farming in Denmark

Rasmus Ørnberg Eriksen[3]

Legislative history

From the 1950´s, organic farming in Denmark was inspected and certified by the Biodynamic Association (Demeter) and later also by the Danish Association of Organic Farming (LØJ) (Landsforeningen Økologisk Jordbrug, 1998). In 1987, the Danish government passed the first law on organic farming in Denmark (Økologilov, 1999). This was followed by the first common European Union (EU) legislation in 1991 (EC 2092/91).

Since 1989, all organic farms from which primary products are to be marketed making reference to the organic production method are certified and inspected by the Plant Directorate (PD) under the Danish Ministry of Food, Agriculture and Fisheries. For details see the announcement and guidance document (Anonymous, 2000). Thus, the whole of Danish organic primary production is controlled by this national authority. Inspection is carried out by six regional centres.

Development in the last decades

From 1989 to 1994, the area and number of organic farms were unchanged, with around 500 farms in total. From 1995 to 2001, the area and number of organic farms has more than tripled due to consumer demand for organic products, lower prices and better economic support from the beginning of the conversion period.

In 2002, there were 3 532 organic farms in Denmark, which represents only a small increase from 2001. These farms covered an area of 171 467 hectares, which is about 6.6 % of the total area under agricultural production. It seems that the number of farms will be largely unchanged from 2002 to 2003. The organic farms are distributed over the whole country, but with a higher concentration in the western (primarily southwestern) part of Denmark.

The average size of an organic farm in Denmark is about 50 hectares, which is similar to non-organic farms. The variability in size is generally larger in non-organic farming, representing both the largest and the smallest farms in Denmark.

Where in the nineties a lot of dairy farms converted to organic production, in the last years primarily arable farms without livestock are converting. Approximately 13 % of the area is permanent pasture. The rest is in rotation. About half is used for herbage (mainly grass-clover) and the remainder for cash crops (mainly cereals).

During the last few years, the market share for the typical organic products has been stable at around 5 %. Organic milk and other dairy products have the largest market share in Denmark (approx. 1/3 of fresh milk sold is organic). Vegetables (mainly potatoes, onions, carrots and salads) and cereal products (mainly rye and wheat for bread, and oats) are also important organic products. Danish production of organic fodder crops generally covers needs in Denmark.

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Danish organic seed production of certain grass species is large enough to cover most of (if not all) the demand within the EU. Also for most cereal species, some other field crops and for potatoes, the Danish production generally covers the Danish market for organic seed. When the new legislation on seed enters into force from January 2004 (Anonymous, 2003), it can be assumed that exports and imports of organic seed will increase rapidly.

Future challenges

- Within the EU, the legislation on substrates for organic greenhouse production and organic production in pots and bags differs from country to country. This is also the case for fruit production, where the number of permitted products and the use of pesticides is quite large in some countries and minimal in others. This is an indefensible situation from a consumer point of view, and leaves the organic farmers governed by the stricter rules at an economic disadvantage to organic farmers in other countries.
- If genetically modified (GM) plants are generally approved in Europe, it may no longer be possible to grow some species organically, as GM plants will inevitably cross with plants from nearby fields. If GM plants are grown and no contamination with GM is allowed in organic plant material, the growing of species such as rape, maize and some grasses may be hazardous for the organic farmer.
- The use of fertilizers, in particular the amount of imported manure from non-organically reared livestock, varies from country to country. This may be a discussion point in relation to leakage into the environment, and the integrity of organic farming generally.
- In order to obtain equal competition and general consumer support for organic products, it is a necessity to achieve more uniform legislation and to harmonize the interpretation of the current legislation throughout the whole of Europe. The great challenge concerning the legislation does not diminish with the accession of new Member States.

Fertilizers and soil conditioners

The use of soil conditioners in organic farming in Denmark is very low. Use of fertilizers imported to the farm is more common, in particular on arable farms without livestock. The type and origin of fertilizers is regulated in Annex II of EC 2092/91. However, the national legislation in Denmark sets a maximum on the import and use of fertilizer (Anonymous, 2000): a maximum of 70 kg nitrogen (N) per ha in rotations can be from non-organic animal manure. Finally, the total amount of fertilizer including organic manure must not exceed 140 kg N per ha.

Plant protection products

In Denmark, the use of plant protection products (PPP) in organic farming is very low compared to the current use in non-organic farming. This is partly due to less intensive growing conditions and probably also to a general opinion among organic farmers that in organic farming the use of pesticides of any kind is not an option. Most of the organic farmers do not use any PPP at all. PPP are mainly used by producers of high-value (intensive) crop types, such as vegetable and fruit products, which depend on very high cosmetic quality and on homogeneous products, in order to achieve reasonable prices and to lower the risk and percentage of produce discarded.

Major PPP

Only few plant protection products are allowed in organic farming in Denmark. It is characteristic of them that all are of natural origin and that their environmental and biological impacts are brief and insignificant.

The use of sulphur against fungi is probably the primary PPP use in organic farming in Denmark. Quartz sand, paraffin oil, fatty acid potassium salt (soft soap) and microorganisms are all allowed, but only used in minor amounts (if at all).

General legislation on use of PPP in organic farming

In Denmark, the overall legislation for the use of different products for plant protection and possible restrictions are administered by the Danish Environmental Protection Agency (DEPA, 1996). Only PPP approved by DEPA can be used as PPP in Denmark. The relevant law is the 'Law on chemical substances and products' (*Bekendtgørelse af lov om kemiske stoffer og produkter*, Consolidation Act No. 21 of 16/01/1996, with later amendments). The law gives an overview of the types of products that are allowed and which kinds of products are prohibited.

The 'Register of approved pesticides' (*Oversigt over godkendte bekæmpelsesmidler*), 2003 is available from the homepage www.mst.dk (only in Danish).

By comparing the list from DEPA with the list in Regulation EC 2092/91, with amendments, the allowed active substances are narrowed down to 11 in all. This means for example that copper, metaldehyde and pheromones are prohibited substances in Denmark.

Hot issues

- Until now (2003), the evaluation of new PPP for organic farming has included looking at all the ingredients of a product. The argument has been that some ingredients may not be active substances, but can nevertheless be the reason why a product has a certain effect. Sometimes inert substances may influence the environment even though they have no biological activity. This creates some difficulties, as inert substances used in PPP are not mentioned in Regulation EC 2092/91.
- As the Danish legislation on organic farming is currently under revision, the described system may soon change, hereby moving towards the same interpretation as in some other European countries.
- Plant extracts are generally allowed for soil improvement, but the same products cannot be used as PPP. This might be changed after the revision of the general EU legislation on pesticides (in connection with Commission Regulation 1112/2002).
- Organic farming organizations in Denmark are critical towards the Danish administration, which is considered to have a stricter evaluation system than other European countries, thereby leading to unequal competition between farmers in Denmark and farmers in other countries.

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Plant protection products in organic farming in France

Marie-Christine Monnier[4]

History, structure and trends of organic farming in France

History and structure

Organic farming and the organic movement began to grow in France in the 1960s, by two different routes:

- 'Nature approach' with a consumers' and organic producers' organization (Nature & Progrès)
- 'Agronomy and business', through the diffusion of the LEMAIRE-BOUCHER method, based on the use of maerl (a calcified seaweed), compost and magnesium inputs.

The 1970s favoured the growth of organic agriculture because of increasing criticism against intensive modern agriculture and the chemical industry, responsible for major ecological catastrophes. Organic farming was at this time one expression of the rebellious youth movement. Private standards ('*cahiers des charges*') were linked to organizations and labels.

The 1980s context was in favour of organic farming, which was in line with a new orientation in policy towards quality products, initiated by the Ministry of Agriculture. Facing important problems of fraud, the organic movement took this opportunity to get official recognition for organic farming. An organic section ('Section Bio') was created within the new national commission for labels and certification (CNLC), and assigned responsibility for agreeing standards. At this time, private standards (mostly global, such as Nature & Progrès, Demeter) coexisted with public standards for production of plants and animals.

With the adoption of EC 2092/91 in 1991, the previous national standards for vegetable products became outdated. The French control system for organic farming was reorganized on the basis of independent certification bodies, which have to be accredited by the authority COFRAC and authorized by the CNLC. Nature & Progrès chose to stay out of this system. ECOCERT was created by a group of agronomists and advisers and became the first certifier dedicated to organic farming which was independent from a consumers' or producers' organization.

After publication of the EC Regulation 1804/1999 on organic animal husbandry in 2000, France chose to adopt a complementary national regulation (known as CC-REPAB F).

A specific national logo (AB; '*agriculture biologique*'), owned by the Ministry of Agriculture, is free for all stakeholders to use in respect of the current regulation for organic farming.

Today, private standards have little influence on consumers, except in the case of labels for biodynamic farming, and for some products not covered by EC 2092/91, such as wine or salt. At national level, EC 2092/91 is completed by specific standards for production of fish and pet food.

In order to guarantee the same interpretation of the current regulation on organic agriculture by certifiers and stakeholders, the Section Bio edited two 'reading guides' concerning vegetable production and animal husbandry.

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Six certification bodies were recognized by the French authorities for organic farming control in 2004: ACLAVE, AGROCERT, CERTIPAQ, ECOCERT, QUALITE FRANCE and ULASE.

Support

A *National Plan* for organic farming was produced by the Ministry of Agriculture for the period 1997-2002, with the aim of better integration of all kinds of support for agricultural development: *financial aids* for conversion of farms, economic assistance for the sector, including processors, *training and advice*, *research* in organic agriculture, and *statistics*.

In this context, several conventional organizations are involved in organic agriculture in their fields of competence: the national agronomic research institute (INRA), the Chambers of Agriculture (APCA), the national network of agricultural schools (with FORMABIO), in partnership with other organic structures, such as ITAB for research, organizations of producers (FNAB) and processors.

During this period, the *1999 Agricultural Policy Law* laid the foundations both for helping organic farming as the main pattern of sustainable agriculture and giving it the structure to develop the sector. Help for conversion to organic farming was given through specific contracts with farmers involved in less intensive and environmentally friendly practices. These contracts have been reduced in 2003, but are still applicable to conversion. The Ministry of Agriculture published a *new plan in January 2004*, the details of which have yet to be completed.

A new national body (*Agence Bio*), created in 2001 under the Ministry of Agriculture's responsibility, is in charge of collecting and publishing appropriate data and coordinating public communication on organic agriculture. See www.agencebio.org and www.printempsbio.com.

Trends

In 2003, organic farming represents a total area of 555 000 ha with 11 377 farms (growth rate: 6 %). The conversion area is depressed (-20 %), as a consequence of the changed financial support system. Organic animal husbandry is increasing at a rate of 5 to 6 %, depending on the species.

The total number of processing units is reduced from 5 252 in 2002 to 4 861 in 2003 (-8 %).

Major inputs used as PPP in France

- Copper and sulphur compounds, sometimes in mixture
- Rotenone (grapevines)
- Pyrethrum
- *Bacillus thuringiensis*
- Granulosis virus
- *Beauveria* sp.
- Pheromones (grapevines)
- Metaldehyde

Due to legal requirements concerning agricultural inputs, certain products are labelled as fertilizers, but are extensively used as PPP (e.g. neem extract).

A national list of available inputs used as PPP was established and published in 2002 under the responsibility of the Plant Protection Service (SPV, a department of the Ministry of Agriculture).

The publication of the Technical Institute for Organic Agriculture (ITAB) gives required information for each type of crop.

Regulatory framework

Organic farmers have to respect legislation concerning organic farming (EC 2092/91) as well as the French policy on agricultural inputs in general, especially on PPP. This policy makes the following requirements:

- For fertilizers and substrates: equivalence with a national norm or market authorization (AMM) after 'homologation' (registration).
- For PPP: homologation and AMM. A database of authorized substances, branded products and their conditions for use is accessible at http://e-phy.agriculture.gouv.fr/wiphy/.
- The previous category of 'simple industrial products', sold without specific authorization, has been suppressed since May 2003. Previously, potassium permanganate was used under this legislation.
- 'Additives for organic matter' can be sold without authorization if they are applied to organic matter directly, and not to the soil.

All products used as PPP must be authorized following the evaluation procedure (see Figure 1, next page). The dossier must prove both efficacy and innocuity. Two different commissions give their conclusions on these aspects before the 'Committee for Homologation' grants or denies market authorization (AMM). For F&SC, a different agreement committee exists, and better connections between the two committees would be desirable. The French Association for Plant Protection (AFPP) is also deeply involved in this process. See http://www.anpp.asso.fr

Hot issues

- *Copper products*: There is concern about their possible prohibition for organic farming at European level. Some progress was made in decreasing the application rates, but there is no real alternative to copper fungicides for a number of commodities grown in southern regions (especially fruit trees, grapevines, vegetables). The nuisibility of copper in soils under various conditions is unclear, and the issue of copper prohibition is perceived as being more of a political than of a technical nature.
- Lack of authorized products for a number of active ingredients allowed by EC 2092/91 (neem, quassia, pure preparation of pyrethrum), because of the complexity and high cost of the legal procedure for AMM.
- The creation of a new legal category 'plant strengtheners', with simpler and more adapted procedures for agreement, is being discussed at national level (Ministry of Agriculture). Products should prove their effectiveness and innocuity before being labelled. It is unclear how such a category would interact with EC 2092/91.
- Potassium permanganate can no longer be used, as of May 2003, because the legal category of 'simple industrial products' is not recognized any more (see above).

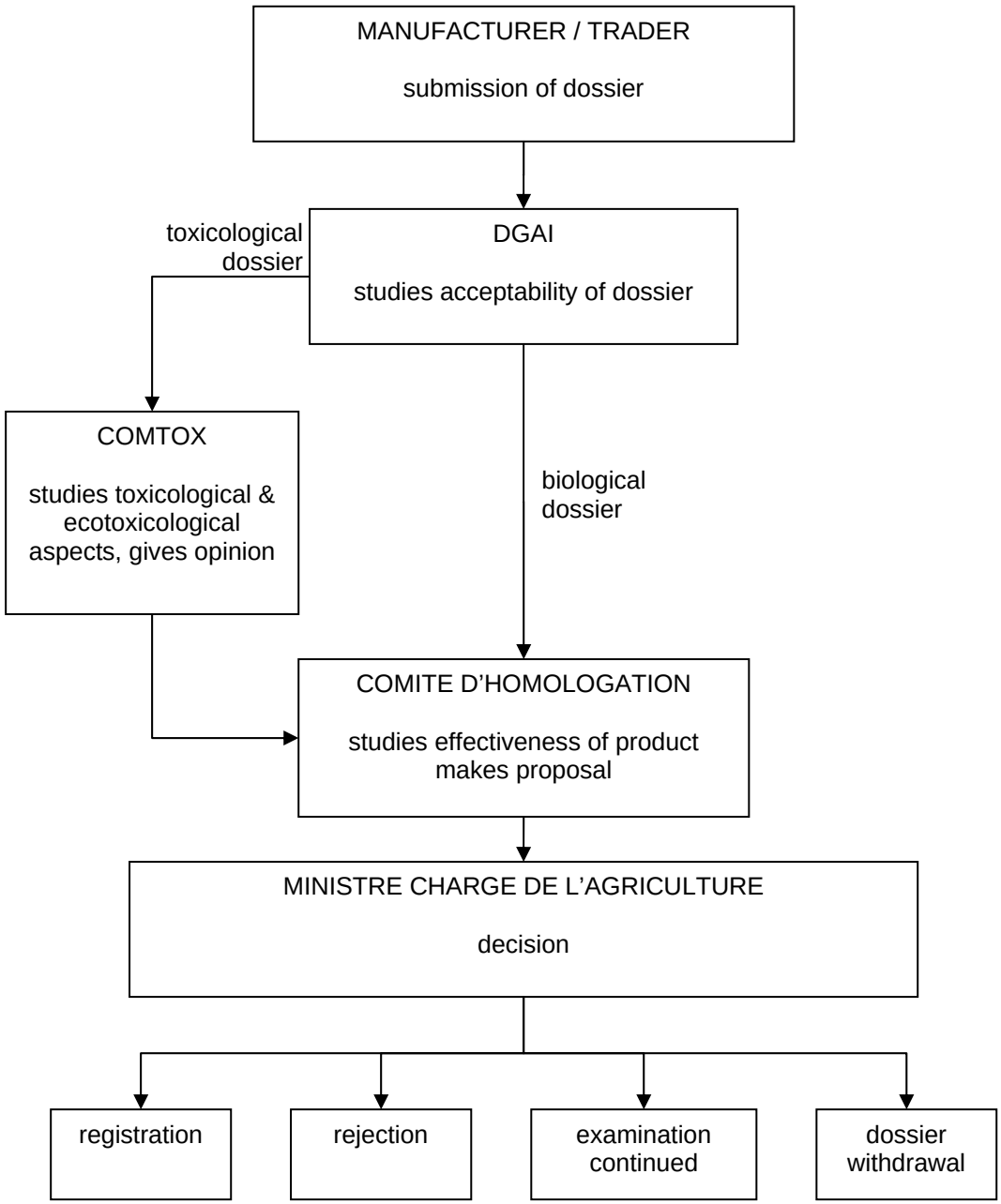

Figure 1: Flow-chart illustrating the registration process for France.

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Plant protection products in organic farming in Germany

Christian Schüler[5]

History and context of organic farming in Germany

Development of organic farming

The development of organic farming in Germany can be divided into three phases. The first phase started towards the end of the 1960s, when the negative environmental effects of industrialized farming and pollution in general were becoming obvious. During the 1960s, it was important to show that organic farming could be practised successfully.

The second phase began when state funding was directed to organic agriculture through the EU extensification programme from 1989 onwards, and later EU Regulations 2078/92 and 1957/1999 supported organic agriculture.

The third phase started in 2001. In order to reach the ambitious government goal of 20 % organic land by 2010, a set of measures was introduced in 2001 including improved support for organic agriculture, the implementation of the Federal Programme for Organic Agriculture as well as the introduction of a national organic seal. By the end of 2001, the number of organic enterprises had increased by 15.4 % compared to the previous year. The statistics show that on December 31, 2001 there were 14 703 organic producers with around 632 000 hectares under organic management. The proportion of organic farms amounted to 3.1 %, and the proportion of organically managed land amounted to 3.7 %.

Regulations supporting conversion to organic farming (e.g. the extensification programme in 1989 and the later agri-environment programmes under Council Regulation 2078/92 and 1957/1999), and EC 2092/91 have greatly helped to make organic agriculture generally accepted.

Regional distribution of organic farms in Germany

The majority of organic farms, as well as the highest ratio of organic farms and organically managed land area, are found in former East Germany. Many organic farms are also found in southern Germany, where organic farming was originally concentrated. These differences are due to:

- the major changes in eastern German agriculture after the reunification of Germany in 1990;
- the designation of large conservation areas with restrictive conditions that are easily fulfilled by organic farmers; and
- the fact that many regions in eastern Germany are classified as disadvantaged areas – often with special incentives for organic farmers.

Organic farming associations

The Demeter Association was founded in 1954 to certify biodynamic agriculture. The producer organization 'Bioland' was founded in 1971; more producer organizations were founded later. The Federation for Organic Farming (Arbeitsgemeinschaft Ökologischer Landbau; AGÖL) was founded in

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1988 as an umbrella association of the six producer organizations (Demeter, Bioland, ANOG, Biokreis, Naturland and Ecovin). Common basic standards ('*Rahmenrichtlinien*') had already been developed in 1984 and continued to be developed up to the year 2002. These standards set the framework within which the standards of the individual organizations operated. AGÖL ceased its activities in 2002.

Standards and inspection

Generally, sovereignty over standards, i.e. the right to decide on which standards are to be accepted or modified, lies with the Assembly of Delegates of the different organic producer organizations and their standards committees. The mission of the standards committees is to draft the standards and to keep them updated. The standards of the organic producer organizations are in several respects stricter than EC 2092/91. For instance, they prescribe the conversion of the whole farm. With respect to processing, the positive lists of these standards are more restrictive, e.g. by limiting the use of enzymes for certain purposes.

Both private and state standards are inspected according to the inspection system as described in EC 2092/91. Private inspection bodies, which are approved and supervised by the state authorities, often inspect according to both standards.

After EC 2092/91 came into force in 1993, a number of farmers and processors began to produce organically without joining one of the existing producer organizations. Currently about 60 % of organic farms are organized in one of the producer associations.

The organic producer organizations as well as processors and traders have been represented since June 2002 by the Union of the Organic Food Industry (Bund Ökologische Lebensmittelwirtschaft – BÖLW) i.e. the central association of the organic food sector. On the international level, organic producer organizations have agreed on the IFOAM international basic norms.

Land use and animal husbandry

Grassland, legume-based leys, the production of vegetables and fruit as well as sheep and goats are of higher importance in organic farming than in conventional farming. On the other hand, comparatively little pig and poultry meat is produced. More information is available under http://www.soel.de/oekolandbau/international_deutschland_ueber.html (in German).

Major inputs

The data basis for organic inputs is very small. Data from the year 2000, presented in the annual report on agriculture by the Federal Ministry of Consumer Protection, Food and Agriculture, show that the input for plant protection is very low. Only 2 DM/ha (=1.3 EUR/ha) were spent on plant protection on organic farms – that is 2 % of what conventional farms spent (93 DM/ha). Compared to this, the input for feed on organic farms is as much as a third (183 DM) of that on conventional farms (488 DM), whereas money spent on fertilizers is only 10 % (15 DM/ha) of the input on conventional farms (149 DM/ha).

Regulatory framework

Definition of terms

First of all, the Act on the Protection of Crop Plants defines the difference between *Plant Protection Products* and *Plant Resistance Improvers*.

Plant Protection Products are defined as protecting plants and plant products against harmful organisms; against animals, plants or micro-organisms which are not harmful organisms; as influencing the processes of plants (e.g. growth regulators) and as inhibiting the germination of plant products. They do *not* include water, fertilizers (as defined in the Fertilizer Act) and *plant resistance improvers*.

Contrary to that, Plant Resistance Improvers are those substances which are intended to enhance the resistance of plants to harmful organisms, to protect plants against non-parasitic impairments and to be used on cut ornamental plants (not for planting material, though).

If a newly developed substance is to be marketed, it has to comply with the following rules: it is not allowed to have harmful effects on human and animal health, groundwater and the natural balance. Furthermore it has to be included on a list of Plant Resistance Improvers issued by the Biologische Bundesanstalt (BBA – Biological Research Centre of Agriculture and Forestry) and the designation "Plant Resistance Improver" plus the list number has to be stated on the containers and outer packaging or packaging inserts.

As EC 2092/91 does not regulate the use of plant resistance improvers, all products recognized as plant resistance improvers may be used in organic agriculture in Germany.

Inclusion on the list of plant resistance improvers

In order for a product to be included on the list, the manufacturer, distributor or importer has to apply for inclusion. The application has to contain the name and address of the applicant, the trade name of the product and its composition (specifying the nature and quantity of the substances using scientific nomenclature). Information on its mode of action and instructions for use as well as the labelling intended for the container and outer packaging or package inserts have to be given.

In addition to this information, several optional points can be submitted with the application in order to avoid separate requests and to accelerate the handling of the application. Topical Safety Data sheets for both the product and its components (if present) and CAS numbers (or similar registration numbers) for clear scientific identification of the (chemical) components of the product should be supplied. If the applicant is not the manufacturer of the product, he or she should be named, as should the manufacturer of the product components. For products which cannot be clearly identified in substance, raw materials and manufacturing procedures can be given. Statements can also be included to the effect that the product – especially products based on organic materials – does not contain pathogenic germs or – for microbial products – it is free from toxic metabolites and that no toxic metabolites are formed. Reference literature should show that the product is harmless with regard to human and animal health, groundwater and the natural balance.

Listing procedure for plant resistance improvers

If the necessary information is given in the application, the listing procedure according to the Crop Protection Act follows three different steps.

First, the Federal Office of Consumer Protection and Food Safety tests whether the application is complete and whether the product is to be classified as a Plant Resistance Improver (plausibility test). If all the information that is necessary for this is not handed in with the application, it requests more documents and samples. When documentation is complete, the processing period of four months starts.

Now the Federal Institute of Risk Assessment (BfR), the Federal Environmental Office (UBA) and the Federal Biological Research Centre of Agriculture and Forestry (BBA) check whether the criteria for marketing the product as a Plant Resistance Improver are fulfilled.

As the last step, the Federal Office of Consumer Protection and Food Safety (BVL) decides in agreement with the other three institutions (BfR, UBA, BBA) whether the product is included in the list of Plant Resistance Improvers.

Numbers and fees

In May 2003 there was a total of 324 applications, of which 222 were already included in the list. 43 applications had been withdrawn or were rejected and 59 were still in progress.

According to the BBA (2002), the fee for the general test, the decision and the inclusion on the list is EUR 290. In case of objections or additional demands, further tests cost between EUR 800 and 5 200.

Categories of plant resistance improvers

There are different categories of Plant Resistance Improvers depending on their ingredients. In 2002, 18 % of the products listed were based on inorganic compounds (stone meal, sodium silicate, etc.), 58 % were based on organic compounds (algae and plant extracts, plant oils etc.), 16 % were homeopathic preparations and 8 % mainly consisted of microbial agents (*Trichoderma* spp., *Bacillus subtilis* etc.).

Applying distinctions similar to those made in the definition of terms, there are three categories of intended purpose. As of May 2003, there were 222 products included in the list, of which 186 were intended to enhance the resistance of plants to harmful organisms. 144 are supposed to protect against non-parasitic impairments and 46 are intended for use on cut ornamental plants.

Some of the Plant Resistance Improvers on the list have multiple purposes: 107 products can be used for the first two categories (harmful organisms and non-parasitic impairment); 3 substances act against harmful organisms and can be used cut ornamental plants; 20 products help against non-parasitic impairment and on cut ornamental plants. Only one of the 222 products can be used for all three purposes.

Hot issues

Several risks and problems may arise as more applications are made for listing of Plant Resistance Improvers. An important point to be considered is that problems might occur when the listing requirements are reduced so that an increasing number of 'low risk pesticides' is included on the list. This may lead to a modification of the basic principles of plant protection in organic farming – away from preventive measures towards direct control of pests and diseases.

- Although bureaucracy and costs might increase, there is no quality control of the listed Plant Resistance Improvers.
- Neither producer organizations nor consumers and environmentalists are involved in the evaluation of Plant Resistance Improvers.
- Advisory services are sceptical about Plant Resistance Improvers and there is only a small market for these products so far.

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Plant protection products in organic farming in Italy

Cristina Micheloni[6]

History and context

In Italy, organic agriculture (OA) started its development quite late compared to other EU countries: in the late 1980s, the number of organic farms was just a thousand. During the 1990s, a huge number of farms converted to OA: in 2001, the total number of organic farms was 56 440 (total operators, including processors, handlers and importers: 60 509) cultivating 1 237 640 ha. This mass conversion was due essentially to two factors:

- Market opportunity (especially for vegetables, citrus and specialities such as pasta or Parmesan cheese) in northern European markets;
- Regional subsidies, direct and indirect: through EC 2078/92 to start with, then through Rural Development Plans grants awarded to converting farms. But there were also several regions giving priority to organic farms when requesting structural intervention funding. So, for example, if requesting funds for stable restructuring, an organic farm has priority over others.

Organic animal husbandry showed some development a few years ago but it never had a significant presence. This is due to extremely reduced and intensified animal husbandry in Italy and to high competition from Northern countries (in a way, it is the result of 30 years of the Common Agricultural Policy (CAP)).

In the last 10 years, organic product consumption and consumer interest started to grow as well, driving many supermarket chains to establish their own organic brands, although the range offered by speciality shops was more important.

Control and certification bodies

The competent authority for OA is the Ministry for Agriculture. It has authorized 11 certification bodies to perform their activities in OA (plus two German ones for the province of South Tyrol). All of them are private organizations. They are overseen by the Ministry of Agriculture together with regional authorities.

Present situation in production

A few years ago Italy had the highest proportion of OA in Europe. But in 2002, statistics started to highlight a change in trends: a decrease of about 1 % in the number of organic operators. By the end of 2002, organic farmers numbered 49 489 (55 902 including processors and importers) cultivating 1 168 212 ha (-70 000 ha compared to 2001) that represent about 8 % of the total agricultural area.

Main areas of production: in terms of hectares, the most important crops are cereals and pulses (272 000 ha), fodder (289 009 ha) and pasture (261 263 ha). In terms of market relevance, vegetables (12 210 ha), fruit (47 220 ha), olive trees (102 055 ha) and vineyards (37 380 ha) are the leaders. Animal husbandry products have a very low importance and are often imported.

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Consumption

OA products follow the same trend as conventional ones: strong exports to the USA, Japan and northern Europe. In the last five years, however, national consumption of organic products (Italian and imported) has increased considerably. Organic products have considerable presence in school canteens and catering. In a few regions they are supported and subsidized by law.

Future developments

In the coming years a further decrease in organic farms is likely, but this will mainly affect organic farms that are unable to sell on the organic market and are compelled to offer their products on the conventional market. At the same time, an increase in national consumption may support local organic farms and allow them to withstand strong competition coming from northern Africa, South America and EU accession countries.

Technical issues

Fertilization

The main problem is *organic matter* re-integration. Animal husbandry (organic and conventional) is reduced, specialized and extremely localized in Italy. Therefore, organic matter should be searched for in other sectors (e.g. the food industries) or provided through other methods (i.e. green manure). However, both options are difficult to organize and implement, and are often too expensive, or perceived as such by farmers. Few farms are self-sufficient in terms of organic matter and nutrients.

Plant protection

The major challenges are:

- Control of flies (Mediterranean, olive and cherry flies).
- Reduction/replacement of copper fungicides. In northern and central Italy, precipitation is high and so are temperatures, which creates an ideal climate for almost all plant pathogenic fungi. The situation is worsened by the length of the vegetative season during which plants are susceptible to diseases (from April to September).

Major inputs used

Fertilization

The major inputs are animal dejecta, composted and pelletted, often mixed with slaughterhouse residues and leather processing residues.

Plant protection

The major inputs are (in decreasing order of use):

- copper (hydroxide and oxychloride, mainly);
- sulphur (wettable and micronized, mainly);
- lime sulphur;
- pyrethrins within traps;
- mating disruption (pheromone dispensers);
- *Bacillus thuringiensis*;
- pyrethrum, rotenone, neem oil;
- oils (mineral, vegetal, paraffinic).

Regulatory framework

National regulations

Regulation EC 2092/91 has been implemented with almost no variation or specification. In contrast, Regulation EC 1804/99 (animal husbandry regulation) has been implemented by a decree (No. 91436 dated 4th August 2000 amended by decree dated March 29th 2001) that adds several further limitations and considerable bureaucratic load. The requirements for certification system definition and identification of certification bodies are set out in Decree 220/95.

F&SC

The general Italian law on Fertilizers and Soil Conditioners is Law 748/84. Concerning inputs for OA, Ministry Circular Letter No. 8 dated September 13th 1999 sets a comparison between EC 2092/91 Annex IIA and national law (Law 748/84) defining marketing characteristics and labelling requirements of F&SC to be used in OA in Italy. It also empowers ISNP (Istituto Sperimentale Nutrizione delle Piante – Research Institute for Plant Nutrition) to evaluate branded products and to publish (on the web) a list of authorized branded products. The evaluation is carried out by dossier submission.

PPP

EU Directive 91/414 is implemented in Italy through Legislative Decree 194/95, with further modification by Presidential Decree 290 dated April 23rd 2001, that establishes a general, simplified procedure for PPP and adjuvants authorization. Specifically, Article 38 deals with PPP for organic and biodynamic agriculture. It allows commercialization and use (under the name of the active ingredient, but not under fancy brand names) of several products traditionally used in OA but not registered/authorized in Italy (e.g. oils, lecithin, herbs, quassia). Before Decree 290 was in force, all PPP had to follow the normal registration procedure. With respect to OA, inerts are neither considered nor regulated. A list of PPP allowed for organic farming in Italy has recently been produced by ISPAVE (Istituto Sperimentale per la Patologia Vegetale) but it mentions only products registered under the normal procedure and not those allowed by the simplified one (ISPAVE, 2004).

Private standards

Private standard are set by four standard setting organizations (AIAB, AMAB, CCPB and Bioagricert). The latter two are also certification bodies.

A few years ago, some certification bodies started a volunteer certification system for inputs (based on dossier evaluation, inspections and analysis), but this was stopped by the Ministry. At present, AIAB (which is an association, not a certification body) is carrying on this voluntary evaluation and publishes a list of certified inputs (F&SC, PPP, feed, processing adjuvants etc.). The list can be downloaded (in Italian) from www.aiab.it.

Hot issues

- The most urgent issue is a legislative process (amending Decree 290/01) intended to further simplify PPP authorization for many products traditionally used in OA. The present version of the simplification has some deficiencies in terms of product categories and was not compatible with current legislation.
- Concerning registered products a complication is due to the fact that registrations are 'crop specific' and minor crops (basil, berries, some vegetables, some kiwi fruit) are often not covered, with the consequence that no use of PPP is permitted for them.
- Registration of *Ryania speciosa*: it is a useful insecticide, but its use is extremely restricted (to Italian organic apple production). This makes it economically unreasonable to register it; at the same time it cannot be authorized with the simplified procedure.
- Copper reduction/replacement: Italian climatic and agronomic conditions make it difficult to reduce copper below 8 kg/ha/year in certain areas and on specific crops.

Decision-making process

The competent authority for OA is the Ministry of Agriculture, but supervisory activity over certification bodies is carried on by regional authorities. PPP issues are dealt with by the Ministry of Health.

Several committees have been set up by the Ministry of Agriculture (a general one, SC&F, PPP, processing, animal husbandry) that are composed of: ministry representatives, researchers, general agriculture unions, consumers association, input producers, and organic movement associations. A participatory approach is not often applied outside the committee.

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Plant protection products in organic farming in the Netherlands

Rob Boeringa[7] *and Marc Trapman*[8]

History and context

Organic farming in the Netherlands started as early as the twenties of the last century, but up to the seventies, its development was very slow. Around 1970, the organically farmed area was merely 450 ha. With the emergence of critical movements (students, environmentalists) and the first report of the Club of Rome, the development accelerated. At the moment, the total organically cultivated area is about 42 600 ha, that is 2.2 % of Dutch farmland. It is composed of the following crops (Anonymous, 2003):

Arable farming, fodder crops	5 100 ha
Arable farming, food crops	6 900 ha
Horticulture, outdoors (of which fruit growing approx. 300 ha)	3 400 ha
Horticulture, glasshouse	75 ha
Grassland (animal husbandry)	19 100 ha
Rest (esp. land in nature reserves for grass and fodder crops)	8 000 ha

From the seventies, there was also growing interest from conventional research and farm advice institutions and the Ministry of Agriculture (Anonymous, 1977; Commissie Onderzoek Biologische Landbouwmethoden, 1977). The real acceleration took place in the beginning of the nineties, when the Ministry published its first policy document (Anonymous, 1992) and the Ministerial Department of Science and Technology produced its action plan on research (Anonymous, 1993). At the moment, the Ministry spends about EUR 10 million on research projects into organic farming, carried out by research institutes and experimental stations of Wageningen University and Research Centre (WUR) and by the private Louis Bolk Institute. This EUR 10 million corresponds to about 8 % of total ministerial, i.e. public, money for agricultural research. There is a relation between this 8 % and the aim of the Ministry to reach 10 % organic market in the year 2010 (Anonymous, 2000).

Starting a few years ago, WUR has an innovation centre for organic farming (*Innovatiecentrum Biologische Landbouw – IBL)* and an advisory committee for research on organic farming (see www.biologischelandbouw.net). These two supervise, coordinate and advise on organic farming research.

The organization *Biologica* is the platform of the organic farming and marketing organizations (See www.platformbiologica.nl). It is supported by organizations of consumers, environmentalists and nature and landscape management. It cooperates with the platform for conventional agriculture (*LTO-Nederland*). As mouthpiece for organic farming it receives financial support from the Ministry of Agriculture. It participates, together with the inspection body (*SKAL*), the Ministry, LTO and several other organizations in a consultative body for legislation on organic agriculture (*Overlegorgaan Biologische Regelgeving – OBR*), especially on Directive EC 2092/91 (Contact: Joost Guijt, Biologica).

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Biologica has *working groups* composed of farmers, farm advisers, researchers and employees of the National Reference Centre for Agriculture, Nature and Food Quality (EC-LNV), an 'expertise centre' of the Ministry of Agriculture. Their tasks are:

- Analysing problems in the cultivation of crops or in animal husbandry and the marketing of produce;
- Advising about, and following research projects;
- Producing views on (desirable) developments in organic farming, e.g. how to deal with intensive, heated glasshouse culture.

There are working groups for:

- Arable farming and outdoor vegetables;
- Arboriculture and herbaceous perennials;
- Fruit growing and vine culture;
- Glasshouse cultures (vegetables, floriculture);
- Dairy cattle husbandry;
- Pig husbandry;
- Poultry husbandry;
- Soil and manure management, environment.

Crop protection: crops, problems/challenges, inputs

The Dutch soil and climate are ideal for grassland and for root crops; there are 1.2 million ha of grassland in 2 million ha of agricultural land in total.

Because of high prices for agricultural land and labour, both conventional and organic farmers grow economically high-yielding crops like potatoes, sugar beet, carrots, onions and vegetables. Except for fodder maize and some other fodder grains, cereal crops are of minor importance (compared with other countries). Imported grain is cheaper and baking quality sometimes better.

Crop rotations are very narrow in conventional agriculture, and not always optimum in organic agriculture (to put it kindly). Some pest and disease problems in organic farming can be attributed to one-sided cropping schemes (on individual farms or in regions). Examples: carrot fly in carrots, thrips in leek, root knob nematode in glasshouse horticulture.

A major challenge in research and farm advice on crop protection is to develop soil management and cropping systems which improve the intrinsic resistance of soils and crops to pests and diseases. But even in – to our mind – sound cropping systems with resistant varieties, we see some problems with pests and diseases. Examples:

- *Apple:* sooty blotch (esp. *Gloeodes pomigena*) in scab resistant varieties; pest insects, e.g. rosy apple aphid, green apple capsid, apple sawfly and several caterpillars;
- *Grape*: downy mildew (*Plasmopara* [*Peronospora*] *viticola*) on mildew resistant (better: tolerant) varieties of grape under bad weather conditions;
- *Potato*: late blight (*Phytophthora infestans*) is still unsolved, despite a lot of breeding research and research in the EU-funded programme 'Blight-MOP'.

There are no reliable data on the use of inputs. We suppose that sulphur compounds (used especially against scab and mildew in fruit growing and mildew in glasshouse crops) are the major input.

The major challenges in the development of inputs are:

- To develop more effective alternatives to sulphur. Sulphur is rather ineffective at lower temperatures and cannot be used on sensitive fruit-varieties. Moreover, sulphur can be harmful to natural enemies. To control scab in fruit growing, a grapefruit seed extract shows considerable promise.
- To develop copper compounds which can be applied at very low dosage. In this respect, copper octanoate might be promising.
- To improve authorization procedures for non-chemical plant protection products (see paragraph 'From problems to agreement').

Legislative framework

Plant protection in organic farming in the Netherlands is amenable to the Pesticide Law (*Bestrijdingsmiddelenwet*; see www.overheid.nl > Wet- en regelgeving > Bestrijdingsmiddelenwet). There are no separate guidelines for plant protection products under private standards. Authorization under the Pesticide Law is executed by the Board for the Authorization of Pesticides (*College Toelating Bestrijdingsmiddelen – CTB*; see www.ctb-wageningen.nl), a committee of independent experts. It is a complex and mostly very expensive procedure. For pheromones and microorganisms, there are simplified authorization procedures.

A special category is the Regulation Exemption Pesticides *(Regeling Uitzondering Bestrijdingsmiddelen – RUB;* contact: Paul Jellema). This is a part of the Pesticide Law which regulates products with such a low risk for man and environment that the usual procedures for authorization are considered unnecessary. Contrary to the other procedures where the decisions on authorization are taken by the CTB (on behalf of the government), the *government itself* decides about RUB authorizations, advised by the CTB. Examples: *milk* as a viricide and against mildew in courgette, *sugar* as a fungicide against a specific disease in arboriculture and several plant oils against pests and diseases. Sometimes, authorization is only given for a specific application method. So, heavy oils like coconut oil and sunflower oil are allowed for spraying, while lighter, volatile oils may only be used for dipping and pouring. RUB authorization can also be given to products which may not be used in organic agriculture (e.g. potassium phosphonate).

Recently, we applied to the RUB authority for the following products:

- *Spiritus* (methylated spirit) against bubbles in mushroom growing;
- *Quassia* against apple sawfly and apple blossom weevil;
- *Potassium phosphonate* (K_2HPO_3) (solution in water and the German product Frutogard) against powdery mildew in viticulture (very restricted application: once or twice shortly before and shortly after flowering, at a rate of 3 kg/ha/application). Potassium phosphonate is already authorized under RUB for use as a fungicide in conventional glasshouse culture. Of course, we know that at the moment this product is not permitted in organic agriculture and that there are difficult (and longstanding) discussions about its acceptability;
- *Coconut soap* against sooty blotch in scab-resistant apple varieties. Soaps, without further specification, already have RUB authorization for use as acaricides and insecticides.

These products are of importance to organic farmers, but probably also to (some) conventional farmers. In the case of spiritus and potassium phosphonate, there is a need not only for RUB authorization, but

also for decision-making on acceptability within IFOAM and under EC 2092/91. To prevent misunderstandings: RUB products are only allowed in organic agriculture if they are included, or can be interpreted as included, in Annex II B of EC 2092/91.

In the Netherlands we do not have a 'plant strengtheners' category. The reason is quite simple: almost all products claim, exclusively or beside other claims, preventive or curative control of pests and diseases. And that claim – on paper or as a verbal message – is the argument for organic and conventional growers to buy these (usually expensive) products. So their application is almost always a pesticidal one, and therefore these products are amenable to the Pesticide Law.

From problems to agreement: The 'Convenant Gewasbescherming' (crop protection covenant)

In practice, there were many difficulties with regard to these authorization procedures (and crop protection policy in general):

- Environmentalist or water management organizations frequently made objections to new authorizations or extensions of authorizations;
- Sometimes, authorizations were lost in the middle of the growing season;
- Despite timetables, authorization procedures could take a very long time.

As a result of long discussions, the Ministry of Agriculture (LNV), the Ministry of Environment (VROM), the platform for conventional agriculture (LTO-Nederland), a platform organization of environmentalists (SNM), organizations for production and trade of pesticides (Nefyto, Arcadis) and organizations for ground and surface water management (VEWIN, Unie van Waterschappen) signed an agreement (Convenant Gewasbescherming; contacts from the Ministry of Agriculture, Nature and Food Quality: Irmo Neijman and Marien Valstar) aiming at the large-scale introduction of integrated, sustainable crop protection. Emphasis is laid on preventive and non-chemical measures, to achieve rapid reduction of environmental pollution. Registration of pesticide use will be obligatory.

In the case of bottlenecks in production, the government can decide to re-allow on a temporary basis products which were already withdrawn, or to allow new applications of already authorized products. Bottlenecks must be argued in detail by the applicants (*LTO-Nederland* but also *Biologica*) and are analysed by *groups of experts* (including experienced farmers) and by the *Plant Protection Service*. This exemption is based on Article 16.aa of the Pesticide Law, and is possible up to the year 2008. 'Bottleneck discussions' perhaps accelerate the current authorization procedures.

Example of a bottleneck from organic agriculture: In spring, wettable sulphur is rather ineffective against scab in fruit growing, and resistant varieties are a minority. Copper compounds ceased to be authorized in March 2000. Lime sulphur is an effective alternative and authorized under EC 2092/91, so Biologica applied for authorization of this product in 2002. The CTB decided to follow the normal procedure for synthetic chemicals. The CTB concluded that there are many unanswered questions with regard to product characteristics, human and ecotoxicology. Partly due to lack of interest from the producer Polisenio, the procedure came to a deadlock in the beginning of 2003. Thereafter the government decided, on the basis of Article 16.aa, to allow the use of lime sulphur in 2003. We hope for this to be extended.

The Dutch Ministry of Agriculture has applied for the authorization of slaked lime ($Ca(OH)_2$) against canker in fruit growing, by means of inclusion in Annex II B of EC 2092/91. Canker is a big problem in countries with an oceanic climate (roughly the northwest of Europe), but also in regions like the Lake Constance area and the north of Italy. The difference is that in the 'oceanic climate countries' the

Netherlands and Denmark copper compounds are not allowed. We hope for a positive decision at the October 2003 meeting of the *Standing Committee on Organic Farming* (*SCOF*).

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Plant protection products in organic farming in Poland

Anamarija Slabe[9]

History and context of organic farming

In Poland, the organic agriculture movement started in the 1980s due to growing public ecological awareness. Early seminars given by 'revolutionary' scientists and German experts led to the establishment of the first organic farmers' association, called EKOLAND, in 1989. In 2002, nine organizations were members of IFOAM. In 1989, there were 27 certified organic farms. The rapid early growth slowed down when the certification system was changed and farms could only obtain certificates after a conversion period of two years. In 2001, 669 farms with a total area of 14 967 hectares (=0.05 % of all farms) and eight food-processing plants held certificates. The Polish Association of Organic Farming (*Polskie Towarzystwo Rolnictwa Ekologicznego – PTRE*), inspected 1 114 farms, BIOEKSPERT 242 and AGROBIOTEST 431 farms in 2001. Farms that produce for the EU-market were also controlled by EU inspection bodies such as *SKAL*, *BCS*, *Lacon*, INAC and *Ecocert*, but there is no exact data on the number and acreage of these farms, and some of these farms are under double inspection (Tyburski *et al.*, unpublished).

The regulation on direct subsidies for organic farms was signed by the Minister of Agriculture in March 1999. They have been paid from 1999 onwards (see table below).

Table 1: Aid for organic farms and for farms converting to organic farming (according to Annex No. 17 of the Decree of May 22nd 2002) (information from: D. Metera 2002)

Crop	In conversion (EUR/ha)	Organic farms (EUR/ha)
Vegetables	125	100
Arable land	50	37
Orchards	137	112
Berries	137	125
Meadows and pastures	20	12

Major inputs used

Very few commercial plant protection products (PPP) are used in Polish organic agriculture; likewise the use of other external inputs (i.e. from outside the farm) is not the usual practice, and is very low.

The reasons are that organic farmers are not used to buying PPP, but also the rather limited availability of these products and their high price. For some more market-oriented farms, a need for commercial PPP exists (U. Soltysiak, pers. comm.).

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Existing legislative/regulatory framework relevant for organic farming

The first organic standards in Poland were those of Ekoland, the strongest organic farmers' association. The Ekoland standards were based on the IFOAM Basic Standards, which were in force until the Polish national legislation on organic farming was enacted (November 2001).

At present, the Polish national legislation on organic farming is the only body of legislation and standards relevant for organic farmers in Poland, including for farmers who are members of associations. Ekoland has given up its standard-setting function.

The basic piece of legislation is the National Regulation on Organic Farming of 16th March 2001 (effective from 3rd November 2001). In accordance with the Polish legal system, the act skips many detailed issues crucial to the functioning of the organic sector. These are included in the executive regulations. The executive regulations were issued by the Minister of Agriculture and are as follows:

- April 12, 2002 – concerning acceptable heavy metal concentrations in soil (this one does not exist under the EU Regulation),
- May 14, 2002 – concerning detailed conditions of organic production (that is: minimum standards of organic production at farm level),
- May 15, 2002 – concerning a list of additional substances, other supporting ingredients and ingredients of agricultural origin made by other than organic methods, and approved for use in processing organic farming products (that is a positive list of acceptable ingredients),
- May 21, 2002 – concerning conditions which should be fulfilled by inspection bodies and set by the Minister of Agriculture pertaining to controlling and certification, and de-certification,

These executive regulations came into force after as little as two weeks (Tyburski et al., unpublished).

The regulation of PPP use in the Polish legislation for organic farming is a transposition (equivalent) of EC 2092/91, both with regard to the justification of the use of PPP and to the annex listing the PPP allowed in organic farming, which is the same as in EC 2092/91.

There are no practical guidelines for the use of inputs in organic production and processing that would make it easier for operators to choose among the inputs available on the Polish market (for example a catalogue or a list of commercial products).

PPP: Issues and trends

At present, interested stakeholders (organic farmers and their associations and control bodies) are waiting for the lists and detailed instructions to be prepared by the Ministry of Agriculture, so there is no ongoing discussion at the moment.

Discussion and decision-making on PPP

It seems that the legislative intervention of the government has had a rather negative effect on activities and development in the field of private initiative (organic farmers' associations, inspection bodies…). The situation has been even more difficult because of the slow speed of state action and a low level of cooperation within the private organic farming sector. This has also had a negative impact on the regulation of the use of PPP, as mentioned above. Thus, there is hardly any public discussion of these issues.

At this point, the decision-making process on PPP is still an open question. As the Ministry of Agriculture has taken over all responsibilities with regard to organic farming, all private actors are awaiting the Ministry's further actions.

In the existing legislation on organic farming, there is no specification of the procedure regarding approval of PPP. At present, no information can be obtained on how this issue will be handled in the future.

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Plant protection products in organic farming in Portugal

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History and context of organic farming

History and trends

The first articles published in Portugal about organic farming date from 1976. But only in 1985, following the first course on organic farming, did a number of interested people gather to found AGROBIO – The Portuguese Association for Organic Farming. This association has, since its beginning, contributed to the promotion and development of organic farming, by organizing fairs and conferences, by certifying, according to private standards, and by providing training and technical support to farmers. Presently, the organic movement has spread at the regional level, through the development of several regional associations, which are also providing technical support to organic farmers (now mandatory for those farmers who apply for subsidies).

Certification

In 1995 certification was transferred from AGROBIO to SOCERT and, more recently two other private control bodies (SATIVA, since the year 2000 and CERTIPLANET, since 2003) also began to certify organic farming. These control bodies are supervised by the national authority, IDRHa (Institute for Rural Development and Hydraulics).

Development and structure

The advent of subsidies for organic farming, among other agro-environmental measures, in 1994, led to a large increase in the number of organic farmers. Presently, there are over 1 060 farmers (0.3 % of the total number of farmers) and 91 000 ha (2.4 % of the total agricultural area). Extensive production is dominant; altogether, pastureland and cereals represent 66 % of the total area under organic farming. Olive groves represent 26 %, whereas dry fruits, fruits, vegetables and vineyards together account for a mere 5 % of the total area under organic farming.

Major technical challenges

The major challenges in plant nutrition concern the lack of organic matter in the soils and the lack of sources of nitrogen. The available organic fertilizers with a high nitrogen content are imported and very expensive. Composting of agro-industrial residues and of source-selected household residues could be part of the answer to this problem. Regarding plant protection, the olive fly (*Dacus oleae*), the Mediterranean fly (*Ceratitis capitata*) and the cabbage and onion flies constitute major problems. Traps for the Mediterranean and olive flies are not available (traps with lambda-cyhalothrin or deltamethrin) or not always effective enough (traps with food bait) to prevent great yield losses. The methods and products used should be improved. Codling moth (*Laspeyresia pomonella*) on apple and pear is also difficult to control, since pheromones are expensive and granulosis viruses are not registered in Portugal. As for

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diseases, the major challenges are presented by downy mildew (*Plasmopara viticola*) on grapevine, late blight (*Phytophthora infestans*) on potato and tomato, apple and pear scab (*Venturia* spp.), and olive diseases (*Gloeosporium olivarum*, *Cycloconium oleaginum* and others).

Major inputs used

Fertilizers and soil conditioners

The main products used are: organic fertilizers, natural phosphates, Patentkali.

Plant protection products (PPP)

In general, the use of PPP is low in organic farming. The most commonly used inputs are sulphur, copper salts, rotenone (not registered!) and mineral oil. Hydrolyzed proteins, diammonium phosphate (not registered!) and pheromones are reasonably used to control or monitor fly pests.

Legislative and regulatory framework

Pesticide registration

All the legislation regarding the authorization and commercialization of pesticides in Portugal can be consulted at the website of the DGPC – General Directorate for Crop Protection (in Portuguese; see www.dgpc.min-agricultura.pt/fitofarmaceuticos/proced_homologa/legisla_pf.htm). A general list of authorized PPP (conventional agriculture) is published by DGPC (Ministry of Agriculture), on an annual basis. According to Decree (*Portaria*) n.º 1232/2001, 25 October, a request for registration of plant protection products for organic farming can be made by any farmer, farmers' organization or company willing to commercialize it. The cost for registration is zero, provided that the PPP concerned are used exclusively for organic farming. However, the process of registration is still quite complex, requiring data which are not always available.

Organic legislation

In Portugal, Regulation EC 2092/91, with amendments, is the only regulatory framework for organic farming. It is available in Portuguese on the website of the Institute for Rural Development and Hydraulics (http://www.idrha.min-agricultura.pt/agribiologica/dossier/dossier.htm). A list of PPP allowed for organic farming (according to the EU legislation) and registered in Portugal (PPA(AB)-01/02) by July 2002, is available at the website of the DGPC – General Directorate for Crop Protection. (see www.dgpc.min-agricultura.pt/fitofarmaceuticos/proced_homologa/pfagricbio_apv.htm).

There are no private standards in use at present. The attribution of subsidies within agro-environmental measures, which include Measure 14 – Organic Farming, is regulated by Decree n.º 475/2001 D.R. n.º 108, I-B Series, 10 May 2001, amended. The 'homologation' (approval) of organic farmers' organizations and organic farming technicians is regulated by Decree n.º 180/2002, 28 February.

PPP lists

The book *Manual de Agricultura Biológica* (Manual for organic farming; Ferreira *et al.*, 2003) contains chapters with lists of commercial products (F&SC and PPP). The first Portuguese guide to inputs for organic farming *Guia de factores de produção para a Agricultura Biológica* was published in 2003 (Ferreira and Falamin, 2003).

Hot issues

The major problem is currently the very short list of registered products available for organic farming, as well as the lack of organic certification for fertilizers and soil conditioners (F&SC) and for PPP (ingredients). Some products, such as rotenone and fatty acid potassium salt are used – though not frequently – in spite of not being registered. This causes problems at the farmers' level with authorities and control bodies. The Ministry of Agriculture has, since October 2001, simplified the registration process for these kinds of products, as explained above. Currently, at least three products that we know of are in the process of submission for registration by private companies: lime sulphur, fatty acid potassium salt and a trap with lambda-cyhalothrin. Though two pyrethroids (lambda-cyhalothrin and deltamethrin) are allowed in traps against olive and Mediterranean fly according to EC 2092/91, no commercial traps with these active ingredients have been available in Portugal so far. Others should follow, in order to achieve equivalent conditions with other European countries. The national Action Plan for Organic Farming, which is now under approval, foresees the possibility of simplified import of PPP from southern European countries (with similar climatic conditions) where they have been registered. It also envisages the mandatory certification of all commercial inputs for organic farming, which would be done by the private control bodies and supervised by the central administration. It also recommends the creation of a national database for organic farming inputs, the prohibition of burning crop residues (exceptions made for wood diseases), and 50 % support within financing programmes AGRO and AGRIS for equipment used in composting / wood recycling, among other measures.

Decision making

The process of consultation within the national Action Plan has, itself, helped to improve communication in the organic sector, and is expected to provide a forum for a more open discussion of current problems and bottlenecks for the development of organic farming. Farmers' and consumers' organizations, certification bodies, advisors and the public administration are involved in the discussion.

The decision-making concerning PPP, however centralized in the public administration (DGPC & Commission for toxicological evaluation of PPP), has shown openness towards contributions coming from the organic sector, namely through making the registration procedure easier. So progress is to be expected, as the national organic sector becomes increasingly dynamic.

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Plant protection products in organic farming in Slovenia

Anamarija Slabe[11]

History and context of organic farming

In the 1980s, organic farming in Slovenia started as a civil society movement with a very limited outreach. In 1996, first standards for organic farming and processing were elaborated. The first two organic farmers' organizations were founded in 1997. In 1998, two inspection and certification (I&C) systems were established. 41 farms were certified in 1998; the basis for I&C were organic farmers' organizations' standards and Regulation EC 2092/91. In 1999, I&C was taken over by the Unit for the Control of Organic Farming at the Institute for Agriculture and Forestry in Maribor, which is the only state-approved I&C body for organic farming. In 1999, five regional organic farmers' associations founded the Union of Slovenian Organic Farmers' Associations (USOFA). In 2003, USOFA has eight members (associations) with some 1 000 individual members (organic farmers). USOFA members share the same standards and organic logo 'BIODAR'. The second organization is the biodynamic farmers' association Ajda, with some 45 certified farms in 2003 (Slabe, 2003).

In 1999, the Ministry of Agriculture, Forestry and Farming (MAFF) introduced direct payments for organic farming and besides NGOs, the agricultural advisory service also started to organize introductory courses in organic farming. The total number of organic farms (including those in conversion) has risen to approx. 1 400 in 2003 (approx. 4 % of all farms). In April 2001, MAFF issued "Rules on the Organic Production and Processing of Agricultural and Food Products", in accordance with the obligations to transpose EU legislation. Support for organic farming has become part of a substantial national agri-environmental programme. However, besides direct payments, only very limited other support measures are in place at the state level. There is also support from some municipalities (Slabe, 2003).

In comparison with other EU accession countries, the macroeconomic importance of agriculture in Slovenia is relatively low: agriculture accounts for 5.3 % of total employment, and the share of agriculture in gross domestic product is 3.1 % (2001). In spite of that, agriculture is an important developmental, social and political factor.

Over 85 % of farms are smaller than 20 ha, and an average conventional farm measures 5.5 ha (organic: 13.4 ha).

Diversity of production is enabled by 3 different climatic and pedogeographic areas: alpine, continental and Mediterranean. Over 70 % of farmland is classified as less favoured area. The majority is grassland and the share of arable land is relatively low. On the other hand, the level of biodiversity is high and nature is well preserved. For all these reasons including accession to the EU, organic farming has a certain place in agricultural policy. For 90 % of the organic farms, the main activity is animal production (predominantly cattle), followed by grain production, vegetables, fruits and some wine. Products are sold on the domestic market.

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Major inputs used

In *animal production*, the major external input is grain fodder as supplementary energy source. Due to the limited availability of organic animal fodder, farmers often use conventional grain fodder within the allowed limits.

In *plant production*, especially in vegetable production, some farmers buy additional *fertilizers* (mainly manure, compost or a range of commercial fertilizers approved for use in organic farming). Use of *PPP* is generally low in organic farming. They are used mostly in fruit production, viticulture, vegetable production and sometimes in potato production.

- *Sulphur* and *copper* are used mainly in wine production, and also in fruit production, although to a smaller extent (M. Bavec, pers. comm.). The use of copper is limited to 3 kg of pure copper per ha per year. This limit has been set by the BIODAR standards (USOFA) and was later (2001) repeated in the state rules for organic farming. Both in wine and fruit production, farmers also use natural preparations to strengthen the plants (plant extracts and preparations) which they often prepare by themselves; the use of commercial products of this kind is very low.
- *Pheromones* are sometimes used in fruit and olive production.
- *Pyrethrin* is sometimes used in vegetable production. There are several commercial products available, including from domestic production.

Existing legislative/regulatory framework relevant for organic farming

The basic piece of legislation is "Rules on the Organic Production and Processing of Agricultural and Food Products" (MAFF, 2001) and its amendment of April 2003. Inspection is regulated by "Rules on technical and organizational conditions that must be fulfilled by organizations for inspection of organic agricultural produce and/or foods", OGRS, May 2001. Both rules are ministerial decrees based on Art. 41, 43 and 44 of the Agriculture Act (OGRS 54/2000, 16.06.2000), which has introduced the concept of organic farming and foreseen its detailed specification and regulation in (previously mentioned) separate acts.

The use of PPP is regulated in the "Rules on the Organic Production..." in a similar way as in EC 2092/91, both with regard to the justification of the use of PPP and by an annex listing the PPP allowed in organic farming, which are more or less the same as those in the EC 2092/91, Annex II.

In addition, there is general legislation on PPP consisting of the Phytopharmaceuticals Act (OGRS 11/2001, 16.02.2001) and Plant Protection Act (45/2001, 07.06.2001). The general provisions of this legislation also apply to the use of PPP in organic farming.

For practitioners, the most important document is the "Catalogue of allowed inputs for organic farming" which is prepared by the inspection and certification body. This catalogue lists all the commercial products available on the Slovenian market that can be used by organic farmers.

PPP: Issues and trends

- One of the major challenges in plant nutrition and protection is the lack of proper (advanced) training and advice, and general structural and other problems (size of farms, lack of money for investment, etc.).
- The issue of PPP in organic farming has not been widely discussed in public, not even in organic farming circles, apart from some individual issues. In Slovenia, only few PPP for organic farming are

being produced, the majority are imported. For the latter, the reference for use is EU legislation on organic farming.

- In the first years (1998-2000), there was a very distinct lack of available commercial PPP suitable for organic production. However, since 2002 this has changed and there are more and more traders asking for their products to be included in the "Catalogue".
- In the case of copper, Slovenian legislation has not taken over the EU legislation, but followed the stricter rules of organic farmers' standards that allow max. 3 kg/ha of copper per year in plant production.

Discussion and decision-making on PPP

Slovenian legislation on organic farming does not mention any decision-making procedure on PPP. The "Rules on the Organic Production…" merely state that only the use of products listed in Annex I of the Rules is allowed. This can be seen as a deficiency that will need improvement in the near future, as the organic sector and the interest of other organizations (consumers, environmentalists, etc.) is developing and growing constantly.

The Ministry of Agriculture is thus responsible for preparation of the list and the minister takes the final decision. Up to now, the Rules and their annexes have been prepared by the Ministry and then, at a relatively late stage, sent to farmers' organizations, the inspection body, the advisory service and certain others for comments. So far, there have been few discussions on PPP, as there has been more emphasis on other, more basic issues. The majority of interested parties accepted the approach of 'copying' EU legislation and its list of PPP for organic farming.

The I&C body therefore has a substantial responsibility for determining suitable PPP. In addition, the "Rules on the Organic Production and Processing of Agricultural and Food Products" also foresee the decisive role of I&C in approving the use of certain PPP in individual cases (see references). The I&C body is making use of the experience gained and progress made in EU countries, especially Austria (ABG – Austria Bio Garantie, an Austrian I&C organization; M. Bavec, pers. comm.).

The above mentioned "Catalogue of allowed inputs for organic farming" of the I&C body is also submitted for comments to the organic farmers' organizations. In the Catalogue, a specific reference is then made to some products that are not allowed for members of USOFA (BIODAR label) but may potentially be used by other organic farmers. So, USOFA does not publish its own list but cooperates with the I&C body in the preparation of the organic inputs catalogue.

Ajda (the biodynamic association) has not produced standards in the Slovenian language so far, but they claim to use German Demeter standards. Since 2003, biodynamic farms are also inspected by the Slovenian I&C body, so in practice, the same catalogue of inputs also applies to them.

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Plant protection products in organic farming in Spain

Victor Gonzálvez[12]

History and context of organic farming in Spain

Agronomic background

Spain has a wide diversity of climates and soils, and consequently a wide range of agro-ecosystems. Agricultural production ranges from subtropical fruit in the Canary Islands and some southern regions, to olives, citric fruit, cereals (particularly in the Central Plateau) and finally dairy and meat products from pastures in the Atlantic north and northwest. Some areas of Spain have very intensive agricultural systems, but there are also vast areas of well-preserved semi-natural land, where traditional agricultural systems have survived (Sevilla *et al.*, 2000) and which are very suitable for organic production (Gonzálvez, 2001). In the south, mainly in Andalusia and Extremadura, there is a peculiar Mediterranean agro-ecosystem called the '*dehesa*'. This is a savanna-like grassland with spaced trees, usually cork or holm oaks, where native breeds of livestock graze freely and feed on the acorns. In some parts of the *dehesa*, cereals and legumes, rotating with the grassland, are cultivated.

Currently, many hectares of *dehesa* and other traditional agro-ecosystem land are certified organic. Organic wine and olive oil production is very important throughout the country, and there are different varieties adapted to all the climates.

Development of organic farming in Spain

Organic farming was started in Spain by a few pioneers in the 1970s (Gonzálvez, 2002). During the last decade, the area dedicated to organic production and the number of certified producers has increased considerably: in 1991 there were 346 producers, 50 processors and 4 235 ha of registered organic land; by 2002, this had risen to producers, 1 204 processors and 665 054 67 ha of land. Spain now has the third largest area of registered organic land in Europe, with an estimated total turnover of EUR 172.9 million. The producers and processors include 1 776 cattle farmers and 147 processors of animal products. Organic farming is at very different stages of development in the diverse regions of Spain (MAPA, 2003). In addition, there are huge variations in average farm size and average yields obtained. In general, organic production predominates over organic processing.

The region of Andalucia has the largest area of organic land (225 598 ha), followed by Extremadura (164 339 ha), Aragon (66 374 ha), Cataluña (ha) and Castilla-La Mancha (40 873 ha). The highest numbers of producers are located in Extremadura (39 %), followed by Andalucía (24 %) and Castilla-La Mancha (6 %). Most processors are located in Cataluña (21.7 %) and Andalucía (17.7 %).

Pastures and forest cover 53 % of the organic land; the rest is distributed between cereals and legumes (32 %), olive plants, (27 %), dry fruits (12 %), vineyards (5 %), fruits and citrus (2 %), vegetables and potatoes (1 %), and set-aside land ('*barbecho*') linked to arable crops (17 %).

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Crop production is distributed as follows (source: MAPA, 2003):

Cereals and leys:	Aragón, Castilla-La Mancha, Extremadura Andalucia, Navarra
Fresh vegetables:	Andalucia, Murcia, Aragón, Valencia
Citrus:	Andalucia, Valencia
Fruits:	Extremadura, Valencia, Murcia, Andalucia
Olives:	Extremadura, Andalucia, Castilla La Mancha
Viticulture:	Castilla La Mancha, Murcia, Extremadura
Dry fruits (almond):	Andalucia, Murcia, Castilla La Mancha, Extremadura, Baleares
Subtropical fruits:	Canarias
Aromatic plants:	Andalucia, Valencia
Forest and wild harvest:	Andalucia, Cataluña, Baleares
Pastures and feed:	Extremadura, Cataluña, Andalucia, Valencia

Animal production is distributed as follows:

Cattle for meat:	Extremadura, Cataluña, Andalucia
Cattle for milk:	Galicia, Asturias
Sheep and goats:	Extremadura, Andalucia
Poultry for meat:	Cataluña
Poultry for eggs:	Baleares, Andalucia
Pig production:	Extremadura, Baleares, Andalucia

Market for organic products

The first 'organic' products appeared in 1975 in Barcelona, as a small assortment of dietary products. In 1978, rice from Calasparra, Murcia was first exported (Gonzálvez, 2001).

Spain exports around 85 % of its organic produce, mainly to other EU countries, but also to Japan and the USA. Local consumption is growing, but is still low. In fact, the majority of consumers still do not appreciate the meaning of the organic labels, and are more likely to respond to labels like 'home-made', 'traditionally produced' and 'natural'. There are very few registered importers of organic products from third countries. Currently, the domestic market is strongly influenced by health food products, and the majority of health food shops (approximately 2 500) offer organic products. It is difficult to find organic products in the conventional distribution network, although some supermarkets promote organic foods (Eroski, Mercadona, Carrefour, El Corte Ingles, etc.). Recently, some specialized organic supermarkets have opened in Barcelona and Madrid (Gonzálvez, 2001). Direct sales from farms play a subordinate role, but there are some examples of successful weekly fairs.

Organic farming organizations

The most important organic producers' associations in Spain are the Asociación de Agricultura Biodinámica de España, Friends of the Agricultural School of Manresa (AEAM, Barcelona), Biolur (Navarra), Ekonekazaritza (Basque Provinces or *Euskadi*), Aula de Agricultura Ecologica (Sevilla), Asociación de Agroecoloxia A. Rodríguez P and the Spanish Society of Organic Farming (SEAE).

Currently, 10 Spanish organizations are members of IFOAM (Vida Sana; BIOCOP; CAFAI; FABIO; AEAM; Natureco S. L.; CAAE-Sevilla; Centro Las Torcas-Granada; ADGE-Cordoba; SEAE). Until the establishment of the semi-public certification and inspection system in 1991, the main activity of the associations was inspection of the associated farms (COPCE-FANEGA-SEAE, 2001).

Some conventional farmers' organizations, like COAG, ASAJA or ENHE, have an internal organic section. In particular, the organic section of COAG is strongly involved in the COPA Organic Group work on standards and others issues at European level. For the most part, Spanish organic producers are organized within the conventional farmers' organizations. The majority of processors have joined the association of organic processors (FA-BIO). Organic consumers have a national federation involving 11 different organizations.

Financial support for organic production

In 1995, the EU Regulation 2078/92 was integrated into Spanish legislation, opening up the possibility for promoting environmentally friendly production methods. Financial support for organic farmers started in 1995 and has influenced the development of the organic sector in Spain (Alonso, 2002a; 2002b; 2002c). Nevertheless, support was more restricted than in other European countries. In 1997, less than 3 % of all funds from European agro-environmental and organic farming programmes (more than 2 300 million ECUS) were distributed to Spain (compared with 23 % for Austria, 17 % for Germany & Italy, and 13 % for France). In addition, the percentage of national funding was lower in Spain (30 %) than in many other countries (Germany 76 %, Austria 48 %, France 50 %). Currently, organic farmers receive a fixed payment per crop and year, fixed by each regional government. In most cases, this payment is lower than in other European Member States.

Policy

Spain was the third country in Europe having legislation on organic farming (Alonso, 2002a; 2002b). Andalusia has started an 'action plan for organic farming', and Castilla-La Mancha and Baleares are drafting regional action plans. Recently, the Ministry for Agriculture, Fisheries and Food (MAPA) has drafted a national action plan, motivated by the European discussion. Some other organic farmers' organizations have proposed a national Action Plan (COAG, 2003).

On the other hand, MAPA issued a National Decree in 2001, liberalizing the term 'biologico' and 'bio' for non-organic products (26 May 2001, BOE nº 126, pg. 18.609, Royal Decree (RD) 506/2001, of 11 May, modifying the RD 1852/1993, of 22 October, on organic production and the labelling of agricultural products and foods). This Royal Decree was issued due to pressure by the drinks and processed products industry, but was rejected by the entire organic sector in Spain, which has mounted several public protest actions and asked the IFOAM EU Group for support. Two members of the Spanish organic sector, COAG and CAAE, have brought legal claims at regional and national courts and at the European Court. Currently, the Basque Provinces' Court has resolved this claim in favour of the organic sector. At European level, the European Commission sent two letters to the Spanish government, asking for revocation of this RD. Since no response was forthcoming, the Commission brought a case against the Spanish government in the European Court. Several companies, like Danone, are taking advantage of the present legal situation by advertising 'Bio-Joghourt' on television, but they are obliged to add "not from organic production" in small print. Export products are not affected, because they must have the legal organic label. For the Spanish organic sector, the greatest impact is the confusion among Spanish consumers about the meaning of 'bio' (COAG, 2003).

Advice, information and training

There is no official support for advisory work in organic farming (Gonzálvez and Altés, 2002) Small producer groups or associations, which are frequently organized in cooperatives, often employ private advisors. There are several magazines on organic farming, the best known being 'La Fertilidad de la Tierra' and 'Revista Humus'. The regional offices of the agricultural administration, and recently the organic sector of the conventional farmers organizations, organize advanced training events for organic farmers. There are several courses for college graduates, and other training courses for practitioners offered by private institutions like Vida Sana and SEAE. Some universities (like Córdoba, Tenerife, Sevilla, Valencia, Barcelona) offer seminars or have included organic farming on their curricula.

Legal framework of organic farming in Spain

Organic farming was first regulated by the private Standards of Vida Sana (Vida Sana, 1982; Vida Sana, 1984) and the Organic Farming Coordination (CAE, 1984; CAE, 1985). In 1989, it was regulated by national law on Origin Denomination and Regulation Council for Organic Farming (RD 759/1988 and Order of 4 October 1989). For the implementation of the EC 2092/91, the Spanish Ministry of Agriculture and Fisheries (MAPA) created a Central Council for Organic Farming Regulation (CRAE). CRAE was the only institution authorized for inspections and certification. It developed a common label for organic farming in Spain. In 1993, MAPA transferred the competence for controlling organic production to the seventeen Spanish 'Autonomous Regions' (ACs). The transfer occurred progressively between 1994 and 1997. Currently, MAPA assumes responsibility for the control of imports from third countries, and represents Spain at the EU Commission.

CRAE is now an advisory board including representatives of the control bodies of every region, public administration and stakeholders of all food channels involved in organic production and consumption. CRAE is organized into different working groups (WGs). One of the most active is called 'Rules, Monitoring and Inspection'. This WG has set the following six standards in addition to EC 2092/91, which are voluntarily implemented at regional level:

- Standards for rabbit production
- Standards for processing of compounded feed for livestock
- Standards for milk and processing of dairy products
- Standards for traceability of meat and meat products in slaughter houses
- Standards for deer (Cervus elaphus) production
- Standards for aquaculture

The ACs can also develop their own standards in some specific subjects, as is the case for the CAAE aquaculture standards in Andalusia. Catalonia is currently reviewing the general technical standards for organic farming.

The public certification system in Spain

Spain has adopted the Regulatory Boards or Committees system for controlling and promoting organic farming. The boards are elected every four years among the registered organic operators. These bodies have over 60 % public support. This model was chosen when national regulation started and has been maintained ever since. It is based on the old Wine Regulation (1972) and the Origin Denomination, which define regional specialities such as wine, cheese and others. Currently, many public certification

bodies are applying to the National Accreditation Company (ENAC), in order to gain international credibility. ENAC is accrediting certification and inspection bodies in Spain according to the Multilateral Agreement (MLA) on EN-45011 Norms.

Private certification in Spain

There are currently four private certification bodies in Spain: CAAE (the former public body of Andalucia), Sohiscert SA (linked to ECOCERT), Agrocolor and Ecal (two new Spanish private certification bodies, coming from the conventional sector). Some international certification bodies (e.g. Bio-inspecta), are also operating in Spain, in collaboration with local inspectors.

Input certification for organic farming

Registration

In Spain, any product used as a fertilizer or pesticide in agriculture must be registered by MAPA (see www.mapya.es/agricultura/pags/fitos/registro/introregistro.htm; in Spanish). However, MAPA makes no distinction between products used in organic or conventional agriculture. The process of registration is expensive, particularly for pesticides, and often prohibitive for products that will not be sold in large amounts. Consequently, some products listed in Annex II A or B of EC 2092/91 are not on the official register in Spain and therefore unavailable to Spanish farmers. For example, only three microorganisms are registered (*Bacillus thuringiensis*, granulosis virus and *Beauveria bassiana*). Some of the inputs listed in EC 2092/91, Annex II need not be registered in Spain. However, no list has been published informing growers which ones these are.

Certification of active substances and branded products

Until recently, neither public nor private inspection and certification bodies in any region had a system in place for certifying inputs, and there were no evaluation procedures or criteria. At the farm level, it can be quite confusing to find out what active ingredients a commercial product actually contains, and hence whether it is permitted or not. As a consequence, inspection and certification bodies have to answer many queries from licensees about what products they can or cannot use.

Currently, inputs for organic farming need a certificate extended by each public certification body, after reviewing whether the active material is included in EC 2091/92, Annex II or VI. This system of having an input certificate from the official certification structure is now widespread in Spain. The Regional Competent Authority for Extremadura and some members of SEAE have published a 'Guide to products permissible for use in organic production' (Labrador and Reyes, 1999), based on a voluntary declaration of the ingredients. The Working Group of SEAE, leaded by J. Labrador, is preparing an updated edition for the end of 2003. This unofficial guide is used as a consultancy book by farmers and technicians in all Spanish regions.

Intereco certification

Recently, 12 public certification bodies have founded the non-profit organization Intereco (2000), to develop an input certification system for their operators (Alonso, 2002b). The aim is to allow easy recognition of inputs which are acceptable for organic production. Certification by Intereco is voluntary at present, but it has been agreed that in the future their associated members will make it compulsory for all inputs used by the operators.

Intereco has established a certification system (SICI) for organic agriculture, starting with fertilizers, and is working to establish another system for pesticides (Gutiérrez, 2001). The products certified by Intereco must be on the MAPA register and must also comply with EC 2092/91. Intereco adds its own rules regarding labelling and precautionary measures for fraud control. Intereco certification procedures are very similar to those for production and processing, with an application, initial inspection visit and concerted (once a year) or unexpected inspection, contract, correction of any non-compliance found, certificate and annual revision. Intereco is a non-profit organization, has no support from the government and depends upon the annual contributions of the member organizations (Intereco, 2003).

Major production problems and inputs used

Plant protection

The major problems are:

- Control of the Mediterranean and White fly. They are controlled with pyrethrins within traps, with mating disruption (pheromone dispensers) and with oils.
- Control of some yellow and red spiders. They are controlled with neem and rotenone (although rotenone is not registered by MAPA ...).

Fertilization

The major problems are:

- Poor content of organic matter in the soil. To increase the organic matter in the soil, some organic farmers use manure, cover crops and several compost types made from animal manure.
- High calcium content, obstructing the availability of some micronutrients to the plant, e.g. iron. Therefore, natural iron sulphate is added to manure, compost or humic acids from composted products.

Hot issues and pending matters

General issues

- RD 506/2001, liberalizing the term 'bio': The organic sector is taking action at several levels and waiting for a court ruling at national and European level (see paragraph 'policy' above).
- Some of the producers and the regional certification bodies organized within Intereco are aiming at developing *higher, private standards* (like the IFOAM Basic Standards). More participation of the sector in these discussions is needed.
- There is a debate as to whether public or private certification bodies are the better option. Producers support the semi-public systems, with public support and improvement of this service. Some of the public inspection and certification bodies are improving their work and being accredited by EU organizations. Most of them are currently working to improve their own internal legal status to comply with the European Union Regulations as independent bodies.
- An input certification system is needed, such as the one provided by Intereco.

Plant protection issues

- Aerial spraying of conventional insecticides in some citrus or olive areas to control the Mediterranean fruit fly is an obstacle for some organic producers in Valencia and Andalusia.
- More effective means for control of the Mediterranean fruit fly in organic farming are needed. New traps with three different attractants are being probed (Tri-pack, authorized in the USA for organic farming). Another research line is applying Effective Microorganisms (EM), like Bocashi, to the soil in order to increase soil activity, facilitating the development of microorganisms which are enemies of some fly forms which need to spend a period of their life cycle on the soil.
- The use of imported rotenone, authorized in France and other European countries for organic farming, but not registered in the Official General Register of MAPA, is a controversial issue in Spain.
- Use of copper products is not a big problem in the calcareous soils of the Mediterranean area, but might be a problem in the humid areas of Spain, if organic production were to increase.

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Plant protection products in organic farming in Switzerland

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History, structure and trends of organic farming in Switzerland

Farming in Switzerland

Large parts of Switzerland are mountainous, and only suitable for animal husbandry. *Animal husbandry* accounts for two thirds of farm income (milk: 36 %; meat and other animal products: 34 %), while one third comes from *crop production* (arable crops: 11 %; fruit and vegetables: 10 %; wine: 7 %; other crops: 2 %). Most farms are between 5 and 15 ha in size (similar for organic and other farms), which is small on an international scale (Bundesamt für Landwirtschaft, 2002).

Development of organic farming practices

In 1924, Rudolf Steiner outlined the principles of a new farming method, which he himself realized were still theoretical at that time and needed to be developed in practice. One major aspect of his principles was the rejection of mineral fertilizers. In 1928, Minna Hofstetter, inspired by the 'Reform' movement and vegetarianism, started to publish on the subject of organic gardening. In the following decades, various farmers experimented along these lines, without much coordination. The ideas of Steiner evolved into the biodynamic methods of farming. In Switzerland, Hans and Marie Müller helped to found the '*Anbau- und Verwertungsgenossenschaft Heimat*' in 1946 (since 1971 '*Bio-Gemüse AVG Galmiz*'). This organization had guidelines for production, and marketed the products under a label comparable with those which organic products are produced and sold under today (for a long time, though, it remained separate from BIO SUISSE). By the 1970s, farming practices similar to modern organic farming had evolved (Vogt, 2000).

Development of standards and regulations

In 1980, five regional organic farmers' organizations decided to adopt common guidelines for organic production. Today, these are known as the standards of BIO SUISSE, and Switzerland is the only country in Europe where all organic farmers' organizations agree on the same, basic private standards (BIO SUISSE, 2003b). The BIO SUISSE standards are similar to EC 2092/91, but have some additional requirements:

- The entire farm must be converted to organic production
- Minimum requirements for crop rotations
- Ecological compensation areas
- Tighter restrictions on copper (1.5–4 kg/ha/year, depending on crop)
- Nutrient balance

In 1995, 'Migros-Bio' was founded as a second major organic programme in Switzerland. Migros-Bio standards for production are on the same level as BIO SUISSE, but the standards for processing and for

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importing are less strict. In 1998, the Swiss Ordinance on Organic Production entered into force ('Bio-Verordnung'; *Verordnung über die biologische Landwirtschaft und die Kennzeichnung biologisch produzierter Erzeugnisse und Lebensmittel*). The regulations it contains are similar to the standards of BIO SUISSE. Although Switzerland is not a member of the EU, Swiss law is regularly adapted to the amendments of EC 2992/91 to facilitate market harmonization and mutual recognition.

Development of production

Over the last ten years, the number of organic farms has increased almost five-fold. In 2003, there were 10.8 % organic farms in Switzerland (=6 466 farms) (BIO SUISSE, 2003a). The majority of these farms are in the mountains and hills, and produce milk and meat, while fruit, berry, vegetable and wine production are underrepresented due to difficulties in production.

Market

Originally, organic products were sold mainly by the farmers themselves and in health stores. The sales volume increased drastically when the two large supermarket chains, Coop and Migros, began to sell organic products (Coop in 1993, Migros in 1995). Today, 50 % of organic products are sold by Coop, 25 % by Migros and 16 % by health stores. At Coop, organic products account for 7 % of food sales (12 % for milk, 20 % for carrots). In 2002, the turnover of organic products rose by 13 % and totalled CHF 1 045 million (approx. EUR 750 million). High growth rates are expected for meat, cheese, fruit and convenience food in the next few years (BIO SUISSE, 2003a).

Farm economy

The Swiss Federal Government has supported organic farming with additional direct payments since 1993. Subsidies are CHF 200/ha for grassland, CHF 800/ha for arable land and CHF 1 200/ha for horticultural crops. In addition, organic farms are entitled to payments which are given to all farms which have at least 7 % ecological compensation areas and animal-friendly husbandry systems.

The prices and price differentials vary greatly for different organic products, depending on production costs. Organic farmers are paid 20 to 100 % more than their conventional colleagues for their products. Together with the subsidies, the result is that incomes of organic farmers are similar to those of conventional farmers.

Major pests and diseases, and use of inputs

In fruit growing, a large number of pests and diseases cause severe problems. The most important are apple scab (*Venturia inaequalis*) and aphids, especially *Dysaphis plantaginea*. In strawberries, grey rot (*Botrytis cinerea*) causes most severe damage. In viticulture, most damage is caused by downy mildew (*Plasmopara viticola*) and grey rot (*Botrytis cinerea*). In potato, late blight (*Phytophthora infestans*) and the Colorado potato beetle (*Leptinotarsa decemlineata*) cause severe damage. In vegetables, a large number of pests and diseases may cause severe problems, depending on the vegetable species. In cereals and in feed crops, there is no major damage from pests or diseases.

- *Disease control:* Copper fungicides are the only means to control late blight and a number of diseases in vegetables and berries. They are also most effective against apple scab and downy mildew of grapes. Clay minerals, lecithin, fennel oil and sulphur (against powdery mildews and scab) are also frequently used as fungicides.

- *Pest control:* Neem (against certain aphids, mainly on apples), pyrethrum (mainly on vegetables), soft soap, rape oil (mainly on apples), mineral oil (mainly in apples), sulphur (against mites on grapes and berries) and 'spinosad' (a microbial fermentation product, mainly used on vegetables) are frequently used insecticides. In addition, *Bacillus thuringiensis* products, granulosis viruses (mainly in apples) and a large number of beneficial insects, mites and nematodes are used for pest control (most often in glasshouses).

Regulatory framework

Annex 1 of the Swiss organic farming ordinance lists the active ingredients allowed in organic agriculture. The list is similar to Annex II of EC 2092/91, but does not contain gelatine, hydrolyzed proteins, potassium alum, diammonium phosphate, metaldehyde, pyrethroids, ethylene and lime sulphur, and copper is restricted to 4 kg/ha. On the other hand, it explicitly mentions 'clay minerals' and 'microbial products' (which allows the use of spinosad). The BIO SUISSE, Migros-Bio and Demeter labels (i.e. ca 99 % of all organic farms in Switzerland) prescribe that only the branded products from the FiBL inputs list can be used.

The FiBL inputs list is updated annually and published in German and French. The 2003 issue contains 191 plant protection products (PPP). The FiBL inputs list is prepared by the FiBL inputs list team, based on the relevant legislation and guidelines, as well as on precedent decisions by the label organizations. Each year, a draft version together with explanations on critical issues is submitted to the label organizations and the relevant authorities for comments, decisions on precedent cases and approval. The approved version is then published by FiBL. PPP are evaluated on the basis of their full composition, which requires that a secrecy agreement be signed before FiBL has access to the full recipes. The criteria for evaluation are mainly based on the IFOAM Basic Standards. For PPP, they are as follows:

- *Registration, necessity and crop-specific use*. PPP can only be used in the crops for which they are registered. However, the range of crops may be further limited in the inputs list. For example, no insecticides or fungicides are allowed in arable and fodder crops (except potatoes).
- *Origin*. In general, the active ingredients of PPP must be of natural origin. Microorganisms and products of soybean, maize, rape and sugar beet must be free of GMOs. If the extraction of a compound from its natural source would be unacceptable, it may exceptionally be produced synthetically, as long as it is chemically identical to the natural compound (e.g. pheromones need not be extracted from insects). For inerts, natural compounds are preferred, but certain synthetic compounds are also allowed (see 'Environment and human health', below).
- *Environment and human health*. The environmental effects of the PPP must be as small as possible. To achieve this, limits to its application may be set (e.g. crop specific maximum quantities for copper products). Inerts with adverse environmental effects are not allowed. For example, nonylphenols have been banned from the inputs list since 1998 (note: meanwhile, nonylphenols have been banned as active ingredients by Regulation EC 2076/2002 dated 20 Nov. 2002 (whether this also covers also their use as inerts, we cannot say with certainty).
- *Quality, ethical and socio-economic aspects*. The use of a PPP must not affect the premium status of organic products. For example, phosphonate (a fungicide for grapevines and other crops) causes significant residues in the harvested products. Even though they are of no toxicological concern, such residues were considered undesirable. Also, a rodenticide which presumably causes suffering in mice before death was not included in the list for ethical reasons (Schmid and Tamm, 2000).

Hot issues

- The use of *copper fungicides* is regularly criticized. Copper use has been limited quantitatively for many years, but copper cannot be completely banned under Swiss climatic conditions without incurring severe losses in fruit, berries, viticulture and vegetables. Thus, the search for alternatives to copper (other products and/or cultural control measures or resistant varieties) has a high priority.
- *Potassium phosphonate* has been considered as a replacement for copper in viticulture, and it was thoroughly investigated by FiBL. As it regularly caused significant levels of residues in wine (although of little toxicological concern), its use was rejected by BIO SUISSE. However, the issue is regularly taken up by foreign producers' associations.
- *Lime sulphur* is used for the control of apple scab in some European countries; thus it is a potential copper replacement. In Switzerland, it is not registered, and therefore not available to organic fruit growers. Lime sulphur is toxic, but less persistent in the soil than copper. Minds have not yet been made up on whether such a product is desirable as a copper replacement.
- Molluscicides based on *iron orthophosphate* have been allowed in organic agriculture in the EU since 2002, but FiBL has not been able to include the only commercial product containing iron orthophosphate in the inputs list. Thus, Swiss vegetable producers feel at a significant competitive disadvantage to their colleagues in the neighbouring countries.
- In a few years, *mycoherbicides* are likely to be commercially available. Presently, the Swiss organic farming ordinance allows no herbicides whatsoever, and the same is true for the BIO SUISSE standards. This regulation was made with chemical herbicides in mind; whether it should also be applied to herbicidal fungi will be discussed in the future. Unlike chemical herbicides, mycoherbicides act on very few, selected weed species, with far lower efficacy, and have only minimal impact on the environment. Because this issue touches on a fundamental guideline of organic agriculture, it needs to be discussed with a much larger group of stakeholders than other issues concerning PPP.

The decision-making process

The FiBL inputs list is updated annually and published in January. In the preceding autumn, companies submit dossiers on novel products to the *FiBL inputs list team*. Applications are sorted as follows: (1) Products which are analogous to other products in the inputs list. These are included in the draft list by the inputs list team on its own responsibility. (2) Products which raise fundamental questions. In these cases, the inputs list team submits a short description of the fundamental question to the label organizations BIO SUISSE and Migros-Bio. Fundamental questions may relate to new compounds, to certain methods of application or certain crops, or products which are already on the list may be reconsidered. (3) Products which are to be rejected for non-compliance, either with legislation or with previous decisions made by the label organizations. These are rejected by the inputs list team on its own authority, but applicants may ask the label organizations to reconsider the issue. Based on the above considerations, the inputs list team prepares a draft version of the inputs list.

- The *label organizations* decide on the fundamental questions raised by the inputs list team, and they confirm that the inputs list is an integral component of their standards and thus compulsory for their producers.
- The *federal authorities* check whether the list is in agreement with organic legislation and pesticide registration.

- Based on the comments of the label organizations and the federal authorities, the inputs list team prepares and edits the inputs list. BIO SUISSE sends a copy of the list to each of their producers (the vast majority of all organic farmers in Switzerland).
- Because Demeter is a member of BIO SUISSE, its members are also bound to the FiBL inputs list. The inputs list team does not evaluate products against separate Demeter standards.

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Plant protection products in organic farming in the United Kingdom

Christopher Stopes[14], Rob Haward and Richard Plowright[15]

The development of organic food and farming in the UK 1998 to present

Since 1998 sales of organic food and drink in the UK have grown faster than any other organic market in Europe. The estimated value of organic food and drink sales increased from GBP 390 million in 1998/1999 to over GBP 1 000 million in 2002/2003 (EUR 1 430 million; Anonymous 1999; 2003). This growth has been triggered by growing demand for organic food by the British public, increasingly in search of safe, healthy and traceable food. On a yearly basis between 1998 and 2001 more British households were buying more organic food more often and spending more. However in recent years (2002 and 2003) market growth has slowed as the number of UK households making purchases has levelled out. Encouraging existing organic buyers to become more committed (spend more, more regularly) has therefore been recognized as a key to future growth. To achieve greater commitment, a number of key challenges face the organic sector and businesses within it, including:

- Increasing emphasis on quality, particularly taste
- Developing awareness of the benefits of buying organic food from all categories: fruit and vegetables through to dairy
- Increasing understanding of what is and what is not organic
- Keeping organic food competitively priced, but not compromising the principles

British farmers have responded to the demand by converting more land to organic production. The area of organically managed land in April 1998 was approximately 105 000 ha, increasing to nearly 730 000 ha by April 2003 (Anonymous 1999; 2003). Pressure from cheaper imports has contributed to the domination of the British market by overseas products. Standards discrepancies have been identified as important factors contributing to disparities in production costs between Member States. In this regard, acceptance of fertilizers and pest control products and the control of their use is regarded as very important.

Major PPP inputs used

The pest and disease challenge in the UK is moderate, compared to other EU countries (particularly Southern Europe). Grassland makes up the overwhelming majority (92 %) of the UK organic area (rotational: 12 %; permanent: 80 %); no PPP are used on grassland. Arable crops (cereals, grain legumes etc.) make up 6 % of the total organically managed area; very small quantities of PPP are used (occasionally sulphur based fungicides). Horticultural crops account for 2 % of the total organic area (Anonymous, 2002).

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It is on the horticultural crops that PPP use is concentrated. However, since pest and disease challenge is relatively low, and the proportion of organic horticultural crops is small, use of PPP in the UK is not high. The use of different types of PPP in organic horticulture is summarized below with details of crop areas derived from Firth *et al.* (2003):

- *Biological control agents (BCA):* Used in protected crops, accounting for only 0.6 % of the total vegetable area, and 30 % of the farm gate value of vegetables. Wide range of classical multi-cellular BCAs used in protected crops. The Soil Association lists 32 BCAs available for organic protected crops (Soil Association, 2002).
- *Copper based fungicides:* Used against several fungal diseases on a range of crops. Most is used on potatoes, which make up approximately half of the total area of vegetable crops (Firth *et al.*, 2003; Soil Association, 2002).
- *Sulphur fungicides:* Used against mildew and *Botrytis* on a range of crops. Limited use.
- *Traps and physical barriers:* Physical barriers (crop covers) are used to protect against insect pests in vegetables and are not regulated. Traps are used for pest monitoring.
- *Others: Rotenone, citrus based, other plant derived pesticides:* No professional products, a few amateur products including Rotenone and Pyrethrum are approved, use is very limited, only very few other plant-derived products are approved under pesticide rules (as repellants), and thus very little use.

Legislative/regulatory framework for organic farming and PPP

Organic farming legislation is made under EC 2092/91 as amended, implemented through the Organic Product Regulations (2001). The competent authority UKROFS (UK Register of Organic Food Standards) was established by the Ministry of Agriculture Fisheries and Food (MAFF), now the Department of Environment, Food and Rural Affairs (Defra), with responsibility for the approval and oversight of private certification bodies through the UKROFS Certification Committee. There are currently 14 approved private certification bodies in the UK. Since autumn 2003 UKROFS has been replaced by a new structure: Advisory Committee on Organic Standards (ACOS). Although the legal basis of ACOS will be different, the function will be largely the same as under UKROFS.

Regulation of pesticides is principally under the Food & Environment Protection Act (1985), Control of Pesticide Regulations (1986) as amended and Plant Protection Products Regulations (1995, 1997). Dossiers, submitted by the manufacturer of the pesticide product and evaluated by the DEFRA Pesticide Safety Directorate, detail the risk to human health, environment, operator and bystander from the pesticides in use. The Advisory Committee on Pesticides considers these, and advises ministers in several government departments (DEFRA, Department of Health, Department of Transport, Local Government and Regions, and the devolved administrations of the UK – Northern Ireland, Wales and Scotland) as to the approval or otherwise of the pesticide and any conditions on use that should be imposed. No producer (whether organic or conventional) can use a pesticide that has not been approved for use through the procedure described above.

Hot issues

- Use of PPP in organic production is contentious. The basic premise of organic production, as understood by consumers in the UK, is that pesticides are not used. However, the very limited use of the few permitted substances means that the 'no pesticide' claim cannot be made. The body that controls

advertising standards in the UK has challenged such claims, on the basis that some pesticides are permitted and used in organic systems.

- The extent to which pesticides are necessary is in part a product of the quality and development of the organic system. More well-established and experienced producers seem to require little or no inputs of pesticides, those recently converted from conventional still have an 'input-based' mentality, which coupled with a poorly developed system appears to necessitate some (though still limited) use of the very few pesticides that are permitted.
- Nevertheless, there are several pest and disease problems that can be relatively important for some growers, of some crops, in some or most years. For example, mildew, potato blight, *Botrytis*, aphids, thrips etc. Weed problems (couch, thistle, poppy, black grass) can also be a severe problem on some farms, and there are no permitted herbicides. Some believe that the pest and disease problems require a pesticide intervention to ensure adequate marketable yields are achieved. The fact that several naturally derived bio-pesticides and microbial biocontrol agents are not permitted in the UK, and that the regulatory authorities and government have ignored this need, is considered by some to be a hot issue that represents a significant bottleneck to development. This discussion is currently very active, and there are likely to be changes in the future. In the meantime, organic producers in the UK are frustrated that those in other EU Member States have access to substances that can control key pests and diseases, whilst in the UK they are not permitted.

Involvement in discussion and decision-making

The key participants in the debate are the private control bodies (CBs), in consultation with UKROFS (and subsequently ACOS from Autumn 2003). The Soil Association has always tended to be more restrictive, and has placed a greater degree of control on pesticidal inputs in the Soil Association standards, operated by Soil Association Certification Ltd (the approved CB). The Soil Association (the owner of the standards) has several Standards Committees – the Agricultural and Horticultural Standards Committees, made up of organic producers and other interested parties, regularly debate and advise on the use of PPP in organic systems.

ACOS, formerly UKROFS, considers issues of the use of PPP. This is supplemented by discussions in the ACOS (formerly UKROFS) Forum, in which all CBs participate. This is all under the Department of Environment, Food and Rural Affairs (Defra). However, no specific prohibitions of the few permitted substances have been made by UKROFS and ACOS is unlikely to prioritize this.

Since there are very few pesticides approved under national pesticide regulations that are also acceptable under organic standards, there is relatively little debate between companies that make such products, although there are several small companies that have recently initiated an association (International Biocontrol Manufacturers Association – IBMA) to lobby on regulatory issues in the UK and in Europe.

As pointed out above, the organization that controls advertising standards (the Advertising Standards Authority – ASA) has persistently challenged claims made about the non-use of pesticides in organic production systems. These challenges appear to have been encouraged by complaints from individuals motivated by the desire to 'rubbish' organic production.

Consumer associations have relatively little interest in the issues concerning the use of PPP in organic production, except to articulate the position that, in the view of consumers, pesticides are not used in organic production.

The Food Standards Agency (the government agency responsible for food and consumers) has recently advised that where consumers wish to limit their intake of pesticide residues they could consume organic

food. They have not entered the debate about the use of PPP in organic food, except to point out that organic standards do permit the use of some (albeit a very limited range) of PPP.

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Plant protection products in organic farming in the USA

Brian Baker[16]

Brief history of organic farming

In the United States of America (USA), as in the rest of the world, organic practices have their foundation in traditional farming methods. Many farmers who questioned the industrialization of agriculture did not adopt modern agricultural technologies. With few exceptions, those who maintained these traditional farming methods did not distinguish their products in the market. The term 'organic' was first used in the USA to describe farming techniques during the 1940s.

During the 1960s and 1970s, 'organic' became established in the USA as a separate identity for food apart from conventionally produced food. The publication of *Silent Spring* (Carson, 1962) was instrumental in building a public awareness of the ecological problems associated with agricultural chemicals in general and the use of synthetic insecticides in particular. This created a growing demand for food grown without ecologically destructive and toxic pesticides, and many consumers considered organic food to be one such alternative. As the market for organic foods grew, so did the need for regulation. The Rodale Press established a set of voluntary standards and a certification program in 1972. Several states passed laws governing organic agriculture in the late 1970s.

The entire farming sector was stagnant for most of the 1980s, with bankruptcy and foreclosure rates not seen since the 1930s. A few large-scale bankrupt conventional farms were still able to plant and harvest crops without using purchased inputs. At the end of a transition period, they discovered that there were buyers who would pay a premium for their crops that were 'organic' by neglect. These farms were possibly the first to go organic for strictly economic reasons and were of considerably larger scale than earlier organic farms. Their market entry made the organic sector more competitive. The success of their methods and rapid expansion of the organic market gained the attention of other non-organic farmers. However, the long-term consequences of these farmers' practices led to pressure for standards that required more sustainable practices than simply the avoidance of chemicals.

As the ecological, health, and welfare consequences of conventional farming systems continued to worsen, organic agriculture found itself serving a growing consumer base seeking an alternative to conventionally produced food. Then, in 1989, a popular television news magazine show aired a story that a plant growth regulator commonly used on apples – daminozide or Alar – was a human carcinogen and was a particular health risk to children (Bradley, 1989). This resulted in an overnight increase in the sale of organic apples and other organic commodities. As a result of limited supply, overwhelming demand, inconsistent laws, and inadequate enforcement, a large quantity of non-organic food products were labelled and sold as organic (US Congress, 1990).

Legislative and regulatory structures

As the result of pressure from organic farming and consumer organizations to protect the meaning and value of the organic label from fraud and abuse, Congress then passed the Organic Foods Production Act (OFPA) as part of the 1990 Farm Bill [P.L. (Public Law) 101-624, title 21. Codified at 7 USC (United States Code) §6501 et seq. November 28, 1990]. OFPA directed the US Department of Agriculture

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(USDA) to create a program for the marketing of organically produced agricultural products. The law's intent was to assure consumers that organically produced products met a consistent standard and to facilitate interstate commerce in fresh and processed organic food.

OFPA set out a procedure and timeline for the USDA to establish a National Organic Program (NOP) for organic certification [7 USC §6503(a)]. Key to the rulemaking process is the National Organic Standards Board (NOSB), a constituency board that balances stakeholder interests [The composition of the NOSB is described at 7 USC 6518(b)]. The NOSB is empowered by OFPA to review and recommend standards to the USDA. In particular, the NOSB is responsible for the recommendation to the NOP for a proposed National List [7 USC §6518(k)(2)]. The NOP is not permitted to allow synthetic substances unless they first appear on the proposed National List [7 USC §6517(d)(2)]. The NOSB also establishes the procedure to petition to have substances added to or removed from the National List [7 USC §6518(n)].

The NOSB refers petitioned materials to expert Technical Advisory Panels (TAP) to provide scientific evaluation of petitioned materials [7 USC §6518(k)(3)]. The NOSB is also required to review available information from the US Environmental Protection Agency (EPA) and other appropriate sources to determine the potential for petitioned substances to cause adverse human and environmental effects [7 USC §6518(l)(1)]. Nothing can be added to the National List that is prohibited by other Federal regulation [7 USC §6517(d)(3)]. The NOSB also is directed to work with input manufacturers through the NOP and the TAP, particularly on the subject of inert ingredients [7 USC §6518(l)(2)]. The OFPA requires the NOSB to submit recommendations for the National List as a result of the TAP's and the Board's evaluation [7 USC §6518(l)(3)].

In evaluating substances considered for the National List, the NOSB is required to consider the seven criteria [7 USC 6518(m)]

- Potential detrimental chemical interactions.
- Toxicity and mode of action.
- Environmental contamination during manufacture, use, misuse or disposal.
- Human health effects.
- Biological and chemical interactions in the agro-ecosystem.
- Alternatives to using the substance including practices.
- Compatibility with a system of sustainable agriculture.

NOSB began operation in 1992 and completed its first set of recommendations in 1996 (compiled in Sligh, 1997). USDA published the first proposed NOP Rule in 1997. The proposed rule did not follow many of the NOSB's recommendations. In particular, it proposed to allow genetically modified organisms, sewage sludge, and irradiation, as well as to allow a number of substances that the NOSB recommended to be prohibited [62 Fed. Reg. 65850 *et seq.*]. The USDA also proposed to broadly allow formulated products without regard to inert ingredients, except for those of toxicological concern (EPA List 1) even in non-pesticide formulations [62 Fed. Reg. 65944]. The EPA classifies inert ingredients into four following categories. List 1 refers to the EPA category of inerts of known toxicological concern. List 2 includes inerts of probable toxicological concern, with a high priority for testing. List 3 is composed of inerts of unknown toxicity, and is the largest category. List 4 contains those inert ingredients that are considered minimum risk. The NOSB recommended that only List 4 be categorically allowed, and that List 3 be reviewed on a case-by-case basis. The NOSB recommended that List 1 and List 2 inert ingredients remain prohibited [Minutes of the NOSB meeting, February 11, 1999].

By not following the NOSB's recommendations or other public input that took place over the seven years since Congress passed OFPA, the first NOP proposed rule resulted in the largest response to a proposed rule that the USDA ever received, and the comments were overwhelmingly negative. A second rule was proposed in 2000, largely addressing concerns raised by public comment to the first proposed rule [65 Fed. Reg. 13512 *et seq.*]. The second proposed rule was broadly supported and formed the basis for the final NOP Rule that was published on December 21, 2000 [65 Fed. Reg. 80548 *et seq*]. According to the regulatory framework created by the NOP Rule, USDA accredited certifiers conduct the certification program. The NOP Rule became effective by accrediting the first certifiers on April 20, 2001 [As codified at 7 CFR (Code of Federal Regulations) §205]. Full implementation of the regulations took place on October 22, 2002.

The NOP standards for crop production are more than simply the substitution of natural inputs for ones that are synthetically produced. Organic production practices must maintain or improve the natural resources of an operation, including the soil and water quality [7 CFR §205.200]. A number of positive management practices are required for soil fertility management [7 CFR §205.203] and crop protection [7 CFR §205.206]. Synthetic substances are generally prohibited [7 CFR §205.105(a)], with exceptions that appear on the National List [7 CFR §205.601]. Natural substances are allowed unless they appear as prohibited on the National List [7 CFR §205.602]. This requirement applies to all substances, not just to active ingredients. Synthetic inert ingredients are permitted only in pesticides, and must be classified as minimum risk (Environmental Protection Agency (EPA) List 4) [7 CFR §205.601(m]. The NOP Rule also prohibits without exception genetically modified organisms [7 CFR §205.105(e)], ionizing radiation [7 CFR §205.105(f)], and sewage sludge [7 CFR §205.105(g)]. A crop cannot be sold as organic for a minimum of three years following the application of a prohibited substance [7 CFR §205.200].

The Organic Materials Review Institute (OMRI) is a non-governmental organization that specializes in the review of substances for use in organic production, processing, and handling. OMRI conducts materials review according to the standards established with implementation of the USDA National Organic Program (NOP). Materials that are allowed or prohibited by the NOP Rule are compiled in the *OMRI Generic Materials List* (see OMRI 2002a) in a cross-referenced format organized under the three modes of production – crops, livestock, and processing. Policy determinations relating to material standards are made by the OMRI Board, which seeks guidance on scientific and technical issues from the OMRI Advisory Council. The Advisory Council serves as an independent body designed to provide a balanced representation of expertise on the scientific, technical, and industry aspects of standard setting. OMRI provides guidance on the compliance of specific brand name products under the NOP via the OMRI *Brand Names Product List*. Specific procedures to evaluate a given product are contained in the OMRI *Operating Manual* (OMRI 2002b). The reviews are conducted by a professional staff and status is assigned by an expert Review Panel.

Widely used materials

The results of a national survey of over 1 000 organic farmers (Walz, 1999) provides evidence that organic farmers follow the principle that organic farming is a management system and apply inputs to supplement cultural practices. Most organic farmers rely on a combination of cover crops and compost to provide for fertility and soil conditioning needs (Walz, 1999, summarized in Table 1). Uncomposted manure and compost tea are used by a much smaller number of organic farms. Supplementation with mineral sources of calcium is also a common practice, used frequently or occasionally by most organic farmers. In areas where pH is high and sulphur is low, gypsum (calcium sulphate) is commonly used. Soils that have low pH are generally treated with limestone (calcium carbonate). Animal by-products such

as fish emulsion, fishmeal, blood meal, bone meal, or meat meal are other common soil amendments. The majority of organic farmers also use kelp and mineral amendments either on occasion or frequently.

Similarly, most organic farmers rely on cultural strategies to manage pests, with crop rotations and beneficial habitat being the two most commonly reported practices (Walz, 1999, summarized in Table 2). *Bacillus thuringiensis* (Bt) is the most commonly used insecticide. Bt and soap are the only pesticides used by more than half of all farmers responding. Dormant and summer oils were next most common. Botanical insecticides are used frequently only by 9 % of the farms responding, with over half never using them at all.

As with pest management, organic farmers rely primarily on crop rotation to manage diseases (Walz, 1999, summarized in Table 3), followed by the selection of disease-resistant varieties. Sulphur and copper are the most commonly used fungicides, used by 40 % and 34 % of responding farms respectively.

Table 1: Use and Frequency of Fertilization and Soil Conditioning Inputs (in %) by USA Organic Farmers in 1999 (approx. 1 000 to 1 100 responses per category; Source: Walz, 1999. Reprinted with permission. In descending order of frequency of use).

Input	Never	Rarely or as a last resort	On occasion	Frequently
Cover crops	7	3	18	72
Compost application	17	5	21	57
Gypsum or lime	22	10	34	34
Animal by-products (e.g. fish products, bone & blood meal, feather meal, etc.)	31	11	25	33
Kelp or seaweed	36	10	25	29
Mineral amendments (other than gypsum or lime)	27	13	34	26
Uncomposted manure applications	43	16	19	22
Compost tea applications	52	14	20	14

Table 2: Use and Frequency of Pest Management Strategies or Materials (in %) by USA Organic Farmers in 1999 (approx. 1 000 to 1 100 responses per category; Source: Walz, 1999. Reprinted with permission. In descending order of frequency of use).

Strategy or material	Never	Rarely or as a last resort	On occasion	Frequently
Crop rotations	18	1	7	74
Beneficial insect habitat	39	5	18	38
Beneficial vertebrate habitat	60	7	12	21
Bacillus thuringiensis (Bt)	43	12	27	18
Beneficial insect, mite or nematode releases	61	10	18	11
Dormant or summer oils	65	11	13	11
Insecticidal soaps	49	18	23	10
Botanical insecticides (e.g. pyrethrum, rotenone, ryania, sabadilla, quassia, neem)	52	21	18	9
Trap crops	60	13	18	9
Pheromones or mating disruption	78	6	8	8
Viral pathogens (e.g. granulosis viruses)	95	3	1	1

Table 3: Use and Frequency of Disease Management Strategies or Materials (in %) by USA Organic Farmers in 1999 (approx. 1 000 to 1 100 responses per category; Source: Walz, 1999. Reprinted with permission. In descending order of frequency of use).

Strategy or Material	Never	Rarely or as a last resort	On occasion	Frequently
Crop rotations	15	1	4	80
Disease resistant varieties	22	3	22	53
Compost or compost tea application	33	7	22	38
Companion planting	42	9	27	22
Sulphur or sulphur-based materials	60	14	14	12
Copper-based materials	66	15	12	7
Solarization	76	10	10	4

Hot issues

Perhaps the most widely discussed, and most controversial issue arising from the NOP Rule – certainly with the broadest impact among organic farmers – is the *restriction of animal manure use*. The NOP Rule defines compost in a more narrow and prescriptive way than the NOSB recommended [7 CFR §205.2; see Sligh (1997) pp. 200-201 for the NOSB's recommended definition of compost]. Many composting practices that were once acceptable may no longer comply under the USDA regulation. According to the NOP Rule, organic farmers are required to have an interval of between 90 and 120 days between the application of uncomposted manure and the harvest of any crop for human consumption sold as organic [7 CFR §205.203(c)(2)]. The minimum interval required between application of uncomposted manure

and harvest of crops intended for human consumption by OFPA was 60 days [7 USC §6513(b)(2)(B)(iv)]. The NOSB recommended that the NOP Rule adopt the statutory minimum (Sligh, 1997). Farmers have complained that the more stringent NOP Rule limits their options, particularly in regions with short growing seasons.

Contamination with products of genetic engineering is also a hot issue. The NOP Rule does not establish a threshold for contamination. Questions regarding what is defined as 'excluded methods' also remain. A flow chart is available to help determine what is and is not the product of genetic engineering (OMRI, 2002b), but it is not universally used or accepted. This issue requires continued review and improvement.

Fortification of fish fertilizers, aquatic plant products, and humic acid derivatives, with *synthetic fertilizers* remains an issue. These commonly accepted natural products are stabilized or extracted by limited amounts of phosphoric acid and potassium hydroxide. Some manufacturers may use the extraction loophole to increase phosphate and potash levels above the minimum needed to achieve the desired stabilization effect. Maximum limits of potash in aquatic plant products and humic acid derivatives have not been set in the NOP Rule. Fish has a minimum pH that is needed to prevent spoilage, but there are no guidelines for phosphate fortification when blending fish with other buffering fertilizers. Blended fertilizers that contain these ingredients further complicate the evaluation to establish whether they are (1) extracted or stabilized, and thus allowed; or (2) fortified and thus prohibited. The NOSB is expected to face petitions from other fertilizer manufacturers who want to use synthetic sources of plant nutrients similar to aquatic plant products, fish, and humic acid derivatives.

On the plant protection side, among active ingredients, one of the newest developments has been the commercial release of *spinosad*, a derivative of the actinomycete *Saccharopolyspora spinosad.* The NOSB voted that it was not synthetic, and did not recommend that it be prohibited. Therefore, it remains allowed without any annotation. Some have raised issues concerning its toxic mode of action, the broad spectrum of organisms that are killed by it, and the potential for development of resistance. While organic farmers rely on cultural methods and classical means of biological control as their primary ways to manage pests, some biocides are needed for serious outbreaks. With many new farmers entering the organic sector from conventional farming, there is a concern that these farmers will simply practice input substitution with spinosad and various botanicals. Certification agents will have a challenge in enforcing requirements through the farm plan and other restrictions on the use of the few broad-spectrum biocides that are available to organic farmers.

To see that the organic farmers who use their products comply with the new rule, manufacturers need to make some adjustments to their pesticide formulations. The NOP Rule requires that the active ingredient is either an allowed synthetic substance that appears on the National List, or a non-synthetic substance that does not appear on the National List as prohibited. Not all active ingredients previously accepted by certifiers were allowed in the NOP Rule. All certifiers now prohibit genetically engineered Bt, piperonyl butoxide, sodium fluoaluminate, strychnine, and tobacco dust, to name a few examples that were allowed by certifiers and petitioned to the NOSB, but not allowed under the NOP Rule (Sligh, 1997).

In addition, all other ingredients must be either non-synthetic or minimum risk (EPA List 4) [7 CFR §205.601(m)]. In general, farmers have had to switch from some commonly used formulations to unfamiliar ones. Since the NOP took effect, NOP-compliant pesticides have been identified; EPA reclassified over 30 inert ingredients to minimum risk (EPA List 4) status (EPA, 2002); formulators have petitioned to add individual synthetic inert ingredients to the National List; and a number of companies have reformulated products specifically to comply with the NOP standard.

While many companies have developed products or reformulated crop protection materials to be compliant with the NOP Rule, there is still a shortage of acceptable materials in certain categories. Currently, there is no approved form of Bt *tenebrionis* for use on Colorado potato beetle (*Leptinotarsa*

decimlineata), a major pest in organic potatoes. Spinosad offers one possible alternative, but as noted above there are concerns over its use. There are no known NOP compliant formulations of rotenone, ryania, or sabadilla. Only a few narrow range spray oils are formulated with allowed emulsifiers that are currently on the market. Some of the more popular copper and sulphur formulations contain unacceptable inert ingredients.

Farmers are complaining that many NOP-compliant pesticides are not as effective as products with the same active ingredient previously acceptable to their certifiers. For example, many apple farmers regarded pheromone formulations that contained only pheromones and List 4 (minimum risk) inert ingredients to be ineffective. The pheromones are delivered in passive dispensers that are hung on trees, and do not contact either the fruit or the soil. The EPA List 3 inert ingredients (unknown toxicity) are only a small percent of the total formulation, but they stabilize the pheromones to ensure their steady release throughout the growing season. The NOSB recommended that List 3 (unknown toxicity) inert ingredients be allowed for use in passive pheromone dispensers.

Finally, continued innovation and development is needed in organic agriculture. Although the NOP Rule allows certifiers to grant variances for research, no producers have been granted such a variance. A consistent research procedure is needed to conduct experiments on certified organic farms.

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Development of evaluation criteria for inputs for organic farming, in view of their compatibility with organic farming principles

Klaus-Peter Wilbois[17]

A study was made, with the goal of building up both clear criteria and an evaluation system for inputs used in organic agriculture. The evaluation system includes active substances and branded products. For this purpose, existing systems both in Germany and abroad were considered and evaluated with regard to their strong and weak points. From these findings, criteria and models for evaluation systems were derived. The results were discussed amongst representatives and officials involved in organic agriculture during a workshop.

Proposals of systems for evaluating active substances and branded products

The proposed system for the evaluation of active substances comprises an expert committee that carries out the technical evaluation of a substance, as well as an advisory council which is to be established by the responsible body. The latter shall decide on the basis of the technical evaluation made by the expert committee whether an amendment of the lists of permitted inputs for organic agriculture shall be pursued.

With regard to the evaluation system for branded products, the advisory council shall pass general decisions on all components of a branded product. On the basis of general decisions passed by the advisory council, the expert committee evaluates the branded products. Accepted products will be inserted in a positive list of inputs. In principle, the positive list of input material shall be submitted for opinions to the advisory council and official authorities (e. g. Federal Biological Research Centre for Agriculture and Forestry (BBA) and the Federal Agency for Agriculture and Food [BLE]).

Outlook

The proposals made in the present study for systems to evaluate active substances and branded products offer a basis for their implementation and use in practice. Once implemented in practice, such evaluation systems offer a reliable and transparent process for the amendment of positive input lists within the rules and standards of organic agriculture, both for active substances and for branded products. With the implementation of such systems, a considerable contribution could be made for the development of organic agriculture and its regulation in Germany and in the EU.

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IFOAM policies concerning inputs evaluation

Francis Blake[18]

General policy of IFOAM EU Group

The IFOAM EU Group is a regional group of the International Federation of Organic Agriculture Movements (IFOAM) and works within the structures and policies of IFOAM. IFOAM is the worldwide umbrella of the organic movement, representing some 700 member organizations in over 100 countries. It works to coordinate and unite the organic movement and to promote organic food and farming at the international level.

In technical questions, IFOAM EU Group defers to the 'IFOAM Basic Standards', and makes its own recommendations only in the areas which are not covered by the IFOAM Basic Standards.

IFOAM Basic Standards

IFOAM Basic Standards are 'standards for standards', not 'standards for certification'. This means that they can only be used as the basis for the development of an organization's own standards, they are not in a form that can be used directly by a farmer or processor to achieve certification. They are also the minimum standards required for IFOAM accreditation which is administered by the International Organic Accreditation Service (IOAS). As a private initiative the IFOAM Basic Standards have no legal standing but their political and practical impact has been huge. Most of the organic legislation worldwide has used them as the starting point and most of the major organic certification bodies are IFOAM accredited.

The IFOAM Basic Standards were first developed in the 1980s. They are kept under review by a standards committee of experts who are appointed by the World Board from nominations from IFOAM members. Revisions are approved at each IFOAM general assembly. The last issue of the 'IFOAM Basic Standards' was published in 2002, after approval by the IFOAM General Assembly in Victoria, Canada.

The 2002 General Assembly voted a new procedure which allows inputs to be approved by the IFOAM World Board in between general assemblies. The procedure is as follows:

- Standards reviewed and amendments drafted and proposed by the IFOAM Standards Committee.
- Decision process involves two rounds of consultation with IFOAM members.
- Final amendment approved by the World Board.
- Approved amendment is ratified by the next general assembly.
- Changes to the basic principles must be approved by the general assembly.

A separate procedure allows regions to develop region-specific standards, provided they are consistent with the general aims and principles of the IFOAM Basic Standards.

With respect to inputs evaluation, the following sections of the IFOAM Basic Standards are relevant:

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- General principles for farming, in particular for prevention and control of pests and diseases, and for maintenance and improvement of soil fertility.
- A list of inputs considered compatible with organic farming (fertilizers and soil conditioners in Appendix 1, and crop protectants and growth regulators in Appendix 2).
- Procedures and criteria for the evaluation of inputs (evaluation of new inputs as well as re-evaluation of allowed inputs) in Appendix 3, described below.

IFOAM Basic Standards, principal aims

These are intended to distil the essence of organic agriculture, therefore they give a context for the standards and provide aspirational guidance for further development. Here is a sample of relevant ones:

- To work compatibly with natural cycles and living systems through the soil, plants and animals in the entire production system.
- To maintain and increase long-term fertility and biological activity of soils using locally adapted cultural, biological and mechanical methods as opposed to reliance on inputs.
- To maintain and encourage agricultural and natural biodiversity on the farm and surrounds through the use of sustainable production systems and the protection of plant and wildlife habitats.
- To use, as far as possible, renewable resources in production and processing systems and avoid pollution and waste.
- To recognize the importance of, and protect and learn from, indigenous knowledge and traditional farming systems.

IFOAM Basic Standards, Appendix 1 – Fertilizers and Soil Conditioners

Examples of materials include (this is about half of them):

Plant and animal origin

- Farmyard manure, slurry and urine
- Source separated human excrement from separated sources which are monitored for contamination – not to be directly applied on edible parts
- Blood meal, meat meal, bone, bone meal
- Biodegradeable processing by-products, plant or animal origin
- Plant preparations and extracts

Mineral origin

- Basic slag
- Calcerous and magnesium amendments
- Mineral potassium (sulphate of potash, muriate of potash, kainite, sylvanite, patentkali) – obtained by physical procedures but not enriched by chemical processes
- Natural phosphates

- Sodium chloride
- sulphur

Microbiological

- Microbiological preparations based on naturally occurring organisms

Other

- Biodynamic preparations

IFOAM Basic Standards, Appendix 2 - Crop Protectants and Growth Regulators

Examples of materials include (about 2/3 of them):

Plant and animal origin

- Algal preparations
- Animal preparations and oils
- Chitin nematicides (natural origin)
- Corn gluten meal (weed control)
- Dairy products
- Natural acids (e.g. vinegar)
- Neem
- Plant oils
- Plant preparations
- Pyrethrum – the synergist piperonyl butoxide is prohibited.
- Quassia
- Rotenone
- Ryania
- Sabadilla
- Tobacco tea (pure nicotine is forbidden)

Mineral origin

- Chloride of lime
- Clay
- Copper salts – max 8kg/ha/year (on a rolling average basis)
- Diatomaceous earth
- Light mineral oils

- Lime sulphur
- Potassium and sodium bicarbonate
- Potassium permanganate
- Silicates
- Sulphur

Microorganisms

- Fungal preparations
- Bacterial preparations
- Release of parasites, predators, sterilised insects
- Viral preparations

Others

- Biodynamic preparations
- Calcium hydroxide
- Ethyl alcohol
- Homeopathic and Ayurvedic preparations
- Sea salt and salty water
- Soda
- Soft soap
- Sulphur dioxide

Traps, barriers, repellants

- Physical methods (e.g. chromatic, mechanical traps)
- Mulches, nets
- Pheromones – in traps and dispensers only

IFOAM Basic Standards, Appendix 3 – Criteria to Evaluate Additional Inputs

Appendix 3 of the IFOAM Basic Standards contains a checklist for evaluation of additional inputs.

Substances for fertilization and soil conditioning

- The material is essential for achieving or maintaining soil fertility or to fulfil specific nutrient requirements which cannot be satisfied by existing practices and products.
- The ingredients are of plant, animal, microbial or mineral origin and may have undergone the following processes: (i) physical (mechanical, thermal); (ii) enzymatic; (iii) microbial (composting, digestion).

- Their use does not result in, or contribute to, unacceptable effects on, or contamination of, the environment, including soil organisms.
- Their use has no unacceptable effect on the quality and safety of the final product.

Substances for pest, disease or weed control

- The material is essential for the control of a harmful organism or disease for which other biological, physical or plant breeding alternatives and/or effective management are not available.
- The active compound should be of plant, animal, microbial or mineral origin and may have undergone the following processes: (i) physical (mechanical, thermal); (ii) enzymatic; (iii) microbial (composting, digestion).
- Their use does not result in, or contribute to, unacceptable effects on, or contamination of, the environment
- Nature identical products (e.g. pheromones) may be considered if they are not available in their natural form, provided they do not directly or indirectly contribute to contamination of the environment or the product.

General criteria: Nature and mode of production

The origin of the input should be (in order of preference):

- Plant, animal, microbial
- Mineral
- Nature identical (only if there are sufficient ecological, technical or economic arguments)

The ingredients may only undergo the following processes:

- Mechanical
- Physical
- Enzymatic
- Action of micro-organisms
- Chemical (as an exception and restricted)

General criteria: Environment

- No harmful or lasting negative impact on the environment.
- No unacceptable pollution of surface or ground water, air or soil - during processing, use and break-down.
- No xenobiotic (harmful to life) ingredients where these are known to accumulate in the food chain.
- Degradable to CO_2, H_2O, and/or to their mineral form.
- Maximum half-life of five days for inputs with a high acute toxicity to non-target organisms (and must be subject to additional restrictions to safeguard these organisms).
- Natural substances used as inputs which are not considered toxic do not need to be degradable within a limited time.

- Mineral inputs should contain as few heavy metals as possible (copper salts are recognised as a temporary exception with restricted use).

General criteria: Human Health and Quality

- Not harmful to human health (all stages of processing, use and degradation to be taken into account).
- No negative effects on the quality of the product - e.g. taste, keeping quality, visual quality.
- Acceptable to consumers' perception of organic.

Input Criteria of Codex Alimentarius for Organic Agriculture

Otto Schmid[19]

The Codex Alimentarius Commission, a joint FAO/WHO Food Standards Programme, is the body that sets international food standards (for more information see: www.codexalimentarius.net). It started elaborating guidelines for the production, processing, labelling and marketing of organically produced food in 1991. Within the Codex Committee on Food Labelling, a special working group with active participation from observer organizations such as IFOAM and the EU carried out intensive work to develop such guidelines, following the Codex 8-step procedure. The guidelines on organic plant production were the first to be approved by the Codex Commission in June 1999, followed by those for organic animal production in July 2001. The requirements in these Codex guidelines are in line with IFOAM Basic Standards and the EU Regulation on organic foodstuffs (2092/91, 1804/99). There are differences with regard to the details and the areas covered (see: 'Comparison of the IFOAM Basic Standards, the Codex Guidelines, and the EU Regulation' by Otto Schmid, in this volume).

These trade guidelines on organic food took into account the current regulations in several countries, in particular EU Regulation 2092/91, as well as private standards applied by producer organizations, especially those based on IFOAM Basic Standards. The guidelines clearly define the nature of organic food production and prevent claims that could mislead consumers about the quality of the product or the way it was produced.

The elaboration of these guidelines is an important step in the harmonization of international rules in order to build up consumer trust. They will be important for equivalence judgements under the rules of the WTO (World Trade Organization). As a contribution to developing the market for organically produced food, the finalization of these Codex guidelines is important in giving guidance to governments as they develop national regulations for organic food.

The Codex guidelines for organically produced food will be reviewed regularly, at least once every four years, according to given Codex procedures. Regarding the list of inputs, it is possible to make use of an 'Accelerated Procedure' which facilitates a quicker update of amendments.

In 2001, it was decided to review the criteria for inputs as well as the lists of substances for agricultural production and processing. This could take into account the technological advances made in the organic food industry, the development of research on organic farming/food and the growing awareness of different consumer groups about such food. It was agreed to review the existing criteria for inputs and to develop the procedure in such a way that decisions on future inputs are supported by technical submissions evaluated on the basis of these criteria. At the meeting of the Working Group for Organic Food within the Codex Committee on Food Labelling in 2002 and 2003, the criteria were revised and they were finally adopted by the Codex Alimentarius Commission in July 2003.

Codex input criteria as a broadly accepted tool for input evaluation

The criteria for new inputs in organic agriculture in the Codex Alimentarius guidelines are a result of long discussions between the European Union delegates, delegates from other countries and IFOAM. They

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reflect a broad consensus and are mostly based on the criteria developed by IFOAM in its Basic Standards. These criteria could serve as a tool for the evaluation of new substances and consideration might be given to taking them up in EU Regulation 2092/91.

Practical experience with the criteria of IFOAM and Codex Alimentarius has shown that further reflection is needed on which is the best way to develop and apply these criteria, e.g.

- by making a clearer hierarchy of criteria
- by further clarifying some of the criteria, such as necessity and socio-economic impact
- by looking at areas which are not fully covered by these criteria.

Strengths of the Codex Alimentarius approach

- Transparent and participatory approach
- Working with broadly accepted decision-making criteria
- Platform for international harmonization
- Strong involvement of the private sector (IFOAM)

Weaknesses of the Codex Alimentarius approach

- Codex Alimentarius is only a guidance document for governments
- The list of substances is an indicative list and not mandatory
- No resources are available for elaboration of detailed dossiers and real reviews
- Not every issue is sufficiently covered by these criteria, e.g. the case of Chilean nitrate

Codex organic input criteria as a starting point

One of the objectives of the ORGANIC INPUTS EVALUATION project is to propose better criteria for Article 7 of EU Regulation 2092/91. The criteria of Codex Alimentarius might provide a useful starting point for these discussions.

Background information

The following documents are annexed as background information:

- *Annex 1*: Codex Alimentarius criteria for new input substances in organic agriculture
- *Annex 2*: Report of the IFOAM delegation on the CCFL Meeting in 2003
- *Annex 3*: Proposed revisions to the Annexes of the Codex Alimentarius Guidelines for organically produced food
- *Annex 4*: Examples of summarized reviews of substances submitted by IFOAM in 2003

Annex 1: Codex Alimentarius criteria for new input substances in organic agriculture

ALINORM 03/22A APPENDIX V: AMENDMENT TO THE GUIDELINES FOR THE PRODUCTION, PROCESSING, LABELING AND MARKETING OF ORGANICALLY PRODUCED FOODS

SECTION 5. REQUIREMENTS FOR INCLUSION OF SUBSTANCES IN ANNEX 2 AND CRITERIA FOR THE DEVELOPMENT OF LISTS OF SUBSTANCES BY COUNTRIES

5.1 At least the following criteria should be used for the purposes of amending the permitted substance lists referred to in Section 4. In using these criteria to evaluate new substances for use in organic production, countries should take into account all applicable statutory and regulatory provisions and make them available to other countries upon request.

Any proposals for the inclusion in Annex 2 of new substances must meet the following general criteria:

i) they are consistent with principles of organic production as outlined in these Guidelines;

ii) use of the substance is necessary/essential for its intended use;

iii) manufacture, use and disposal of the substance do not result in, or contribute to, harmful effects on the environment;

iv) they have the lowest negative impact on human or animal health and quality of life; and

v) approved alternatives are not available in sufficient quantity and/or quality.

The above criteria are intended to be evaluated as a whole in order to protect the integrity of organic production. In addition, the following criteria should be applied in the evaluation process:

(a) if they are used for fertilization, soil conditioning purposes

- they are essential for obtaining or maintaining the fertility of the soil or to fulfil specific nutrition requirements of crops, or specific soil-conditioning and rotation purposes which cannot be satisfied by the practices included in Annex 1, or other products included in Table 2 of Annex 2; and
- the ingredients will be of plant, animal, microbial, or mineral origin and may undergo the following processes: physical (e.g., mechanical, thermal), enzymatic, microbial (e.g., composting, fermentation); only when the above processes have been exhausted, chemical processes may be considered and only for the extraction of carriers and binders; and
- their use does not have a harmful impact on the balance of the soil ecosystem or the physical characteristics of the soil, or water and air quality; and
- their use may be restricted to specific conditions, specific regions or specific commodities;

(b) if they are used for the purpose of plant disease or pest and weed control

- they should be essential for the control of a harmful organism or a particular disease for which other biological, physical, or plant breeding alternatives and/or effective management practices are not available, and

- their use should take into account the potential harmful impact on the environment, the ecology (in particular non-target organisms) and the health of consumers, livestock and bees; and
- the use of chemical processes in the context of these Criteria is an interim measure and should be reviewed in line with the provisions as set out in Section 8 of these Guidelines.
- substances should be plant, animal, microbial, or mineral origin and may undergo the following processes: physical (e.g. mechanical, thermal), enzymatic, microbial (e.g. composting, digestion);
- however, if they are products used, in exceptional circumstances, in traps and dispensers such as pheromones, which are chemically synthesized they will be considered for addition to lists if the products are not available in sufficient quantities in their natural form, provided that the conditions for their use do not directly or indirectly result in the presence of residues of the product in the edible parts;
- their use may be restricted to specific conditions, specific regions or specific commodities;

(c) if they are used as additives or processing aids in the preparation or preservation of the food:

- these substances are used only if it has been shown that, without having recourse to them, it is impossible to:
- produce or preserve the food, in the case of additives, or
- produce the food, in the case of processing aids in the absence of other available technology that satisfies these Guidelines;
- these substances are found in nature and may have undergone mechanical/physical processes (e.g. extraction, precipitation), biological/enzymatic processes and microbial processes (e.g. fermentation),
- or, if these substances mentioned above are not available from such methods and technologies in sufficient quantities, then those substances that have been chemically synthesized may be considered for inclusion in exceptional circumstances;
- their use maintains the authenticity of the product;
- the consumer will not be deceived concerning the nature, substance and quality of the food;
- the additives and processing aids do not detract from the overall quality of the product.

In the evaluation process of substances for inclusion on lists all stakeholders should have the opportunity to be involved.

5.2 Countries should develop or adopt a list of substances that meet the criteria outlined in Section 5.1.

The open nature of the lists

5.3 Because of the primary purpose of providing a list of substances, the lists in Annex 2 are open and subject to the inclusion of additional substances or the removal of existing ones on an ongoing basis. When a country proposes inclusion or amendment of a substance in Annex 2 it should submit a detailed description of the product and the conditions of its envisaged use to demonstrate that the requirements under Section 5.1 are satisfied. The procedure for requesting amendments to the lists is set out under Section 8 of these Guidelines.

Precautions (Introduction to Annex Tables 1 and 2 in Codex Alimentarius Guidelines for organically produced food

1. Any substances used in an organic system for soil fertilization and conditioning, pest and disease control, for the health of livestock and quality of the animal products, or for preparation, preservation and storage of the food product should comply with the relevant national regulations.

2. Conditions for use of certain substances contained in the following lists may be specified by the certification body or authority, e.g. volume, frequency of application, specific purpose, etc.

3. Where substances are required for primary production they should be used with care and with the knowledge that even permitted substances may be subject to misuse and may alter the ecosystem of the soil or farm.

4. The following lists do not attempt to be all inclusive or exclusive or a finite regulatory tool but rather provide advice to governments on internationally agreed inputs. A system of review criteria as detailed in

Section 5 of these Guidelines for products to be considered by national governments should be the primary determinant for acceptability or rejection of substances.

Annex 2: Report of the IFOAM Delegation about the meeting of the Codex Alimentarius Committee on Food Labelling (CCFL) in Ottawa, Canada from April 28 to May 2, 2003.

Brian Baker, Diane Bowen and Otto Schmid, IFOAM delegation

The discussion at the meeting on the further development of the guidelines for organic food was focussing on 2 main areas:

a. the revision of the criteria for new inputs and substances for food processing;

b. the annex list for crop production and processing

The group met a day before the official meeting and 2 times in between the main meeting, before the outcome was presented in the main plenary session of CCFL.

a. Revision of criteria for inputs

The revised criteria to evaluate new inputs, additives and processing aids for organic food and farming moved to the final step of the process, where the Codex Alimentarius Commission will have the opportunity to vote on it (which was the case in July 2003). CCFL affirmed that the Annexes are open, and that the criteria take precedent over the lists. The input and additive lists are indicative guidelines. Member states may allow substances not on the lists, and may prohibit substances that appear on the lists.

b. List of substances for crop production and for processing

Various crop production and processing inputs were permitted to move to member state consultation, or Step 5, where it will be eligible to be voted on by the Commission next year. Participants requested that eight items be added to the list of Substances for use in Soil Fertilizing and Conditioning. Of these, only four are being proposed. Out of 16 revisions requested to be added to the list of Substances for Plant Pest and Disease Control, seven were advanced to proposed draft status.

Items that did not have a completed dossier were not advanced. Items identified as controversial were placed in [square brackets]. Others substances , such as plant extracts and biodynamic preparations, were not included because they were seen as being already covered inn the main text of the guidelines.

There was a strong intervention from Chile to move ahead sodium nitrate as fertiliser without a dossier. This was objected by the majority of the participants mentioning that this issue has been discussed in the Organic Agriculture Movement for many years and that IFOAM and almost all organizations except USDA (still allowed during a limited time) and Chile do not accept this product. Chile will have an opportunity to prepare and present a dossier at next year's meeting.

CCFL advanced a proposal, brought in by USDA, that in exceptional circumstances for the extraction of carriers and binders used for fertilizers chemical processes may be considered. It also revised the annotation for human excrement to make it more protective of human health. Annotations to prohibit wood ash and wood charcoal from chemically treated lumber were put forth in brackets. Other than that, Table 1 will remain unchanged. Items that were advanced in crops were chitin nematicides and sabadilla. There was no objection to revise the annotations for copper and mineral oil. Iron phosphate used as a molluscicide was advanced in brackets, as were rodenticides used in livestock buildings and installations.

With regard to the list of additives requests, based on a criteria evaluation for sodium phosphate, sodium pyrophosphate, sodium nitrate, and potassium nitrate were advanced over the strong opposition of IFOAM and certain member states, most notably Denmark. The International Dairy Federation submitted criteria based dossiers for phosphates, and Switzerland submitted also dossiers for the use of ascorbates (Sodium, Calcium and Potassium ascorbates) together with nitrates for the purpose of curing sausages and other meat products. These were advanced to Step 5 in brackets, meaning that they may be struck before advancing them to the Commission.

Decision procedure

The Codex Alimentarius Commission at their meeting in Rome June 30-July 7 2003 has adopted the revision of the criteria.

At the next meeting of the working group of the CCFL (Codex Committee on Food labelling) in Ottawa/Canada in May 2004 the list of substances will be reviewed and in particular the proposed substances will be discussed and in case of agreement moved to the Codex Alimentarius Commission for final approval.

Annex 3: Proposed Revisions to the Annexes of the Codex Alimentarius Guidelines for organically produced food / May 2003 (Products in brackets are still in discussion)

Table 1: Substances for use in Soil fertilizing and conditioning

Substance	Proposed by	Description; Compositional Requirements; Conditions of Use
Human excrement	Chile	Need recognized by certification body or authority. The source is separated from household and industrial wastes that pose a risk of chemical contamination. It is treated sufficiently to eliminate risks from pests, parasites, pathogenic microorganisms, and is not applied to crops intended for human consumption or to the edible parts of plants.
Sawdust, bark, and wood waste	European Union	Need recognized by certification body or authority [wood not chemically treated after felling]
Wood ash	European Union	Need recognized by certification body or authority [from wood not chemically treated after felling]
Wood charcoal	European Union	[Only charcoal from wood not chemically treated after felling].

Table 2: Substances for Plant Pest and Disease Control

Substance	Proposed by	Description; Compositional Requirements; Conditions of Use
Chitin nematicides	IFOAM[1]	natural origin
Sabadilla	IFOAM	—
Beeswax	Switzerland	—
[Iron phosphates]	IFOAM	[molluscicide]
[Rodenticides]	Switzerland	[Products for pest or disease control in livestock buildings or installations]
Mineral oils (in traps)	Switzerland	Need recognized by certification body or authority.
Mechanical control devices such as e.g. crop protection nets, spiral barriers, glue-coated plastic traps, sticky bands	Switzerland	—

Table 3: Ingredients of Non-Agricultural Origin Referred to in Section 3 (Processing)

For Plant Products

INS#	Substance	Specific Conditions
333	Calcium citrate	Acidity regulator, stabilizer, dispersing agent, antioxidant.
334	Tartaric acid	---
[422]	[Glycerol]	[from plant extracts]
551	Silicon dioxide	Anti-caking agent for herbs and spices

For Processing of Livestock and Bee Products

INS#	Substance	Specific Conditions
153	Wood ash	Specified traditional cheeses as recognized by the certification body or authority.
170	Calcium carbonate	Milk products, not as a colouring agent.
[250]	[Sodium nitrate]	[Where no alternate technology exists for certain products, may be used for: pickling salt for meat products except sausages for frying, products made of fish, crustaceans, and molluscs.]
[252]	[Potassium nitrate]	[Where no alternate technology exists for certain products, may be used for: raw picked products and raw cured meat products.]
270	Lactic acid	Sausage casings / milk products.
290	Carbon dioxide	---
300	Ascorbic Acid	In meat [and dairy] products, provided insufficient natural sources are available.
[301]	[Sodium ascorbate]	[In meat products, provided insufficient natural sources are available.]
[302]	[Calcium ascorbate]	[In meat products, provided insufficient natural sources are available.]
[303]	[Potassium ascorbate]	[In meat products, provided insufficient natural sources are available.]
306	Tocopherols, mixed natural concentrates	As an antioxidant in mixed products to prevent fat oxidation.
322	Lecithin	Obtained without the use of bleaches or organic solvents. Mil products / milk based infant food / fat products / mayonnaise.
327	Calcium lactate	Stabilizer for thickening pasteurized milk and cream products.
330	Citric acid	As coagulation agent for specific cheese products and for cooked eggs.
331	Sodium citrate	Sausages / pasteurization of egg whites / milk products, emulsified sausage, and melted cheese. Stabilizer for thickening pasteurized milk and cream products, and emulsifying salt for processed cheeses.
332	Potassium citrate	---
333	Calcium citrate	Stabilizer for thickening pasteurized milk and cream.
[339]	[Sodium phosphate]	[Stabilizer for thickening pasteurized milk and cream products]
[340]	[Potassium phosphate]	[Emulsifying salt for melted and processed cheese and stabilizer for pasteurized creams]
400	Alginic acid	As a thickener for milk based and mixed products.
401	Sodium alginate	As a thickener for milk based and mixed products.
402	Potassium alginate	As a thickener for milk based and mixed products.
406	Agar	---
407	Carrageenan	Milk products
410	Locust bean gum	Milk products / meat products
412	Guar gum	Milk products / canned meat / egg products
413	Tragacanth gum	---
414	Arabic gum	Milk products / fat / confectionery / glazing agent
440	Pectin (unmodified)	Milk products
[450]	[Diphosphates]	[Emulsifying salt for melted and processed cheese and stabilizer for pasteurized creams]
[452]	[Polyphosphates]	[Emulsifying salt for melted and processed cheese and stabilizer for pasteurized creams]
500	Sodium carbonates	Milk products for pH regulation in traditional cheese varieties prepared out of sour milk.
509	Calcium chloride	Milk products / meat products
938	Argon	---
941	Nitrogen	---
[942]	[Nitrous Oxide]	[Packaging gas, propellant for whipped cream]
948	Oxygen	---

Table 4: Processing Aids Which May Be Used for the Preparation of Products of Agricultural Origin

For Plant Products

Substance	**Specific Conditions**
Sodium hydroxide	pH adjustment in sugar production. [Oil production for rape seed (*Brassica spp.)]*

For livestock and bee products

Substance	**Specific Conditions**
Calcium carbonate	---
Calcium chloride	Firming, coagulation agent in cheese making.
Kaolin	Extraction of propolis
Lactic acid	Milk products: coagulation agent, pH regulation of salt bath for cheese.
Sodium carbonates	Milk products; neutralizing substance
Water	---

Annex 4: Examples of summarized reviews of substances submitted by IFOAM in 2003

Further elaborated evaluation summaries of the proposed substances for plant pest and disease control, prepared by IFOAM for Codex Alimentarius Guidelines for Organic Food

Compatibility	Scoring
very positive	++
positive	+
not to evaluate	00
both positive and negative	~
negative	-
very negative	--

1. Chitin nematicides (Natural Origin): criteria for the inclusion in Annex 2

Criteria for review		Chitin nematicides: review, justification	Scoring
Section 5.1 General Principles	consistent with the principles of organic production	Natural origin: derived from crab shells, oyster shells or other aquatic animals. Non-toxic.	++
	substance is necessary/essential for its intended use	Nematodes can cause extensive damage.	+
	manufacture, use and disposal does not result in, or contribute to, harmful effects on the environment	Made from crab shells, oyster shells. Some manufacturing processes use sulphuric acid, potassium hydroxide, and urea.	+
	lowest negative impact on human or animal health and quality of life	Beneficial for many soil organisms. No negative impact on human health, livestock, or wildlife.	+
	approved alternatives not available	Compost, diatomaceous earth, beneficial organisms, neem cake. It is more effective and a viable substitute for methyl bromide and other chemical nematicides.	++
Section 5.1(b) Used for Plant Disease or Pest and Weed Control	essential for the control of a harmful organism or particular disease for which other biological, physical or plant breeding alternatives and/or effective management practices are not available	Used to control plant nematodes where biological, physical or plant breeding alternatives and the above alternatives are not effective.	+
	[use should take into account potential harmful impact on the environment, ecology and health of consumers, livestock and bees]	Beneficial to the environment in that it provides a way to recycle wastes from the seafood industry. Consumers are not exposed to any residues. Not harmful to livestock or bees.	+
	undergo physical, enzymatic or microbial process	Some products are treated with strong acids and bases—in particular hydrochloric acid and potassium hydroxide. One theory of the mode of action is that this stimulates the growth of microorganisms that produce chitinase.	+
	products used in traps and dispensers which are chemically synthesized if other products are not available provided use does not result in residue in the edible part	Not applicable	00
	use restricted to specific conditions, regions or commodities	Mechanically processed without the addition of synthetic chemical treatments.	+

2. Sabadilla: Criteria for the inclusion in Annex 2

Criteria for review		Sabadilla: justification, review	Scoring
Section 5.1 General Principles	consistent with the principles of organic production	Safely used in many sustainable systems for hundreds of years as a natural form of pest control.	+
	substance is necessary/essential for its intended use	Necessary and essential in some regions for the management of insect pests of the orders Anoplura (lice), Hemiptera (true bugs), Orthoptera (grasshoppers), Thysanoptera (thrips). Often the least toxic available natural control for certain target pests.	+
	manufacture, use and disposal does not result in, or contribute to, harmful effects on the environment	From the dried ripe seeds of *Schoenocaulon officinale*, a relative of the lily, native to northern South America. Mixed with sulfur, lime, or diatomaceous earth and applied as a dust, or sprayed in a kerosene solution. Use according to instructions is not harmful to the environment. A natural product, it is fully and quickly biodegradable.	+
	lowest negative impact on human or animal health and quality of life	Highly selective, even within the same family of insects. Effectively toxic to only a small number of pest insects. Non-toxic to most beneficial organisms. Accidental exposure causes irritation,	+
	approved alternatives not available	Non-toxic alternatives exist but are not always effective. Less toxic than other approved alternatives such as rotenone. Some other alternatives may not be locally available because of resistance. Also, because the mode of action is different, it is useful to manage insect resistance to *Bacillus thuringiensis,* pyrethrum, and other approved treatments.	~
Section 5.1(b) Used for Plant Disease or Pest and Weed Control	essential for the control of a harmful organism or particular disease for which other biological, physical or plant breeding alternatives and/or effective management practices are not available	Locally essential for the treatment of insects in the orders Anoplura, Hemiptera, and Thysanoptera when biological, physical or plant breeding alternatives and other management practices fail.	++
	[use should take into account potential harmful impact on the environment, ecology and health of consumers, livestock and bees]	Consists of about 0.3% alkaloids, of which crystalline veratrine (cevadine) and veratraidine are the chief members. Historically used as a medicinal herb in South and Central America. LD_{50} (ip, mouse): 7.5 mg/kg. Exposure to consumers is not much of an issue. Poisoning of applicators is rare, but has been known to happen. No record of toxicity to bees.	~
	undergo physical, enzymatic or microbial process	Physically processed by crushing. Some products may then be combined with petroleum solvents.	~
	products used in traps and dispensers which are chemically synthesized if other products are not available provided use does not result in residue in the edible part	May be used in various traps as an alternative to carbamates and organophosphates. These uses will not result in residue in the edible part.	+
	use restricted to specific conditions, regions or commodities	Because it is narrow-spectrum, locally produced, and limited to certain regions, sabadilla use is self-limiting.	+

3. Iron phosphates as molluscicide: Criteria for the inclusion in Annex 2

Criteria for review		Iron phosphate: justification, review	Scoring
Section 5.1 General Principles	consistent with the principles of organic production	Iron phosphate occurs in nature, is non-toxic, and degrades into essential nutrients.	++
	substance is necessary/essential for its intended use	Slugs and snails are a widespread problem. While there are some non-chemical alternatives, many organic farmers need a least-toxic molluscicide to reduce populations.	+
	manufacture, use and disposal does not result in, or contribute to, harmful effects on the environment	Occurs in nature; synthetic form is nature identical. Adequately pure sources do not pose a problem with heavy metals.	+
	lowest negative impact on human or animal health and quality of life	Iron phosphate appears to be the least toxic chemical control for mollusks.	++
	approved alternatives not available	There are some cultural and biological alternatives, but the efficacy varies according to climate, target pest, and cropping system.	+
Section 5.1(b) Used for Plant Disease or Pest and Weed Control	essential for the control of a harmful organism or particular disease for which other biological, physical or plant breeding alternatives and/or effective management practices are not available	Molluscs are vectors of human parasites in certain parts of the world. In many places they are very destructive to food crops. While a number of cultural and biological practices can help reduce mollusc damage, certain organic practices such as growing green manures and mulching may make the problem worse.	+
	[use should take into account potential harmful impact on the environment, ecology and health of consumers, livestock and bees]	Iron is an essential nutrient. Generally non-toxic; safe for livestock and wildlife. Iron phosphate is approved as a nutritional supplement for food. While long-term build-up may be toxic in low pH soils already high in iron, plants and animals have a high tolerance for iron. Bees are not exposed.	+
	undergo physical, enzymatic or microbial process	Most commercial sources are produced by the reaction of steel manufacturing by-product with phosphoric acid. Usually combined with chelating agents, such as ethylene diamine tetraacetic acid (EDTA).	-
	products used in traps and dispensers which are chemically synthesized if other products are not available provided use does not result in residue in the edible part	Baits are applied to soil and are not intentionally applied directly to the edible parts of plant.	++
	use restricted to specific conditions, regions or commodities	Not for use as a phosphate fertilizer unless from a mined source.	+

4. Copper salts: Criteria for the inclusion in Annex 2

Limitation of use: max. 8kg/ha per year (on a rolling average)

Criteria for reiew		**Copper salts (limitated use): justification, review**	**Scoring**
Section 5.1 General Principles	consistent with the principles of organic production	Copper salts occur in nature and copper is an essential nutrient.	++
	substance is necessary/essential for its intended use	For certain plant diseases, there are no effective alternatives.	+
	manufacture, use and disposal does not result in, or contribute to, harmful effects on the environment	Copper mining. Copper is not biodegradable and accumulates. Long-term use needs to be restricted to protect the soil from such accumulation. Mining may generate large amounts of arsenic. Smelting produces sulfur emissions that cause acid rain.	~
	lowest negative impact on human or animal health and quality of life	Generally non-toxic when properly used.	+
	approved alternatives not available	While some progress is being made on biological alternatives such as antagonists and classical plant breeding for resistance, some plant diseases do not have any approved alternatives available.	+
Section 5.1(b) Used for Plant Disease or Pest and Weed Control	essential for the control of a harmful organism or particular disease for which other biological, physical or plant breeding alternatives and/or effective management practices are not available	Essential for the control of certain bacterial and fungal diseases, such as various blights and mildews.	++
	[use should take into account potential harmful impact on the environment, ecology and health of consumers, livestock and bees]	Long-term buildup of copper in the soil will be toxic to plants and earthworms (depending on the amounts used). Toxic to fish and other aquatic organisms.	-
	undergo physical, enzymatic or microbial process	Copper ore is smelted and then processed into copper oxide. This can be reacted with sulphuric acid to produce copper sulphate, sodium hydroxide to produce copper hydroxide, or hydrochloric acid to produce copper oxychloride.	-
	products used in traps and dispensers which are chemically synthesized if other products are not available provided use does not result in residue in the edible part	Generally not used in traps. May result in residues on edible parts, particularly in vegetables such as celery treated for late blight and spinach treated for downy mildew.	-
	use restricted to specific conditions, regions or commodities	Annual application rates and total loading rates need to be restricted to protect the environment. Use on edible vegetable parts may also need to be restricted.	-

Overview of EU Regulations for Plant Protection Products in Organic Farming

Bernhard Speiser and Otto Schmid[20]

Introduction

The present article gives an overview of the legal regulations concerning the use of plant protection products (PPP) in organic farming (OF). It is a selective summary of the presentations and discussions held at the workshop 'Inventory of existing procedures for evaluation of plant protection products to be used in organic agriculture', held on September 25–26, 2003 in Frick, Switzerland. The article focuses mainly on regulations at EU level, although national legislation and private standards are also relevant. Two kinds of regulations will be discussed:

- *Organic farming regulations*. These include PPP among many other topics.
- *PPP regulations*. These apply to all PPP, regardless of whether used in organic or conventional agriculture.

Organic farming regulations

Regulation EC 2092/91

At EU level, OF is regulated by Regulation EC 2092/91. Table 1 gives an overview of the contents of EC 2092/91. The following parts are relevant for PPP:

- *Article 6* sets up Annex II as an exhaustive list of substances to be used as inputs (Annex IIB for PPP).
- *Article 7* lists the procedures and criteria for making changes to Annex II. The procedure is as follows: Member States may submit a dossier on a substance; the Commission may decide to put it on the agenda of the Article 14 Committee; the decision is taken by the Standing Committee for Organic Farming ('SCOF' or 'Article 14-Committee'). The main criteria for PPP are: (i) they must be essential and no alternatives must be available; (ii) they must not come into contact with the seed, the crop or crop products ('non-contact clause'). For perennial crops, the non-contact clause contains some exceptions; (iii) they must not have unacceptable effects on the environment; (iv) substances which were in common use in OF before 1991 need not fulfil the above requirements ('traditional use clause').

The *non-contact clause* is a severe obstacle to the inclusion of new substances, and hinders progress in the field of PPP. Nevertheless, it protects OF from potentially undesirable compounds.

Annexes to EC 2092/91

- *Annex I* describes the principles of organic production at farm level. Paragraph 3 prescribes that pests diseases and weeds shall be controlled by a combination of appropriate species and varieties, appropriate crop rotation, mechanical cultivation procedures, protection of natural enemies of pests, and flame weeding. PPP shall only be used in case of immediate threat to the crop.

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- *Annex IIB* lists all substances which can be used as PPP in organic farming (note: it regulates only active ingredients, and not inerts).

Historical development of the EU Regulation 2092/91 with respect to PPP

1991	Publication of the OF Regulation (2092/91). Annex II lists all substances which are allowed, without further restrictions.
1994	First review: a second column is added in Annex II, which specifies restrictions for use (2381/94).
1995	The "traditional use clause" is added in Article 7 (1935/95).
1997	Second review: Annex II B is split up in four categories (1488/97): I. Substances of crop or animal origin II. Microorganisms used for biological pest control III. Substances to be used in traps and/or dispensers IV. Other substances from traditional use in organic farming
2000	Third review: minor amendments (1073/2000).
2001	Fourth review: minor amendments (436/2001).
2002	Fifth review (473/2002): Restrictions on use of copper Inclusion of iron (III) orthophosphate in the new category IIIa. Preparations to be surface-spread between cultivated plants

National regulations and private standards for organic agriculture

A few Member States also have national legislation on PPP in OF. While they may prohibit certain substances listed in EC 2092/91, they cannot allow additional substances. In the states associated with the EU which were represented at the workshop, organic farming regulation is very similar to EC 2092/91. Some private standards also limit the choice of PPP to be used, but again this is not frequent.

All these regulations regulate *active ingredients* only. *Inerts* are only regulated at state level by the National Organic Program of the US, and at private level in Switzerland.

In conclusion, organic farming regulation of PPP is fairly homogenous across EU Member States as well as non-EU-members, and even between most private standards.

PPP regulations

Regulation EC 91/414

At EU level, pesticide registration is regulated by EC 91/414 and amendments. Here, we outline only some aspects of particular importance for OF. The review programme for existing active substances is divided into 4 stages, only the last two of which are relevant for OF. Notification of substances for re-evaluation was carried out under the 'ReNDeR' projects. The 3rd stage is covered by Commission Regulation 451/2000. In the course of this re-evaluation, copper fungicides were given positive approval.
The 4th stage covers the remaining 200 active substances which were not covered by the previous stages. The 4th stage covers a large proportion of the PPP used in OF. In the 4th stage, a simple notification (pre-notification) is possible for substances that are

- authorized in foodstuffs,

- plant extracts,
- animal products,
- attractants/repellants or
- commodities.

A full notification is required for

- microorganisms,
- rodenticides or
- substances to be used on stored products.

Notifications had to be made to ReNDeR by 1.11.2002 (Regulation 1112/2002). The notifications were reviewed by ReNDeR for acceptability/completeness, and a list of substances admitted for re-evaluation was prepared (see Commission decision 565/2003). In addition to notification, Member States could also propose derogations for substances of 'essential use'. These are listed in 2076/2002. Substances notified or of essential use may be placed on the market until December 31, 2008, while the others had to be withdrawn by July 2003 (2076/2002).

For the evaluation of certain categories mentioned above, separate 'guidance documents' are currently being prepared.

Minor uses

DG SANCO has recognized that authorization for minor uses is a problem: "... For minor uses, national markets are mostly too small to recover these costs [i.e. of registration]. As a result a lack of authorizations exists for many of these uses. The European harmonization of registration requirements (Directive 91/414) has increased the burden on the registration process considerably which is having a large impact on minor use registrations where in the past data requirements were often minimal. A consequence of this problem is an increase in illegal use of pesticides. ..." (Cited from SANCO/2971/2000). The document proposes guidelines for voluntary mutual recognition of minor use authorizations. However, this issue is not yet resolved and activities are ongoing.

Plant strengtheners

In 2001, the Netherlands submitted a draft guidance document on data requirements for plant strengtheners (SANCO/1003/2001). At that time, it was assumed that several substances included in the 4th stage of the review programme might be subject to reduced data requirements. The discussion was therefore delayed until such time as more practical experience and examples were available.

National regulations

All countries considered have national legislation on PPP registration, and only the use of registered PPP is allowed. All compounds listed in Annex II B of EC 2092/91 are registered in at least one Member State, but many of them are also unregistered in at least one Member State. The following are the main factors determining whether products are registered:

- Countries differ widely in how strict their ordinary registration procedures are. Also, some countries have established 'fast track' or 'low cost' procedures for certain product categories, which often comprise PPP used in OF.
- In some countries, it is apparently possible to register products as fertilizers (a faster and cheaper procedure), which can be used as PPP (e.g. copper, neem).
- Companies decide whether or not to submit a compound for registration. This decision is based on registration costs, expected market volume and marketing strategies.

In conclusion, there is large variability among the countries studied in the range of PPP registered and not registered.

Use of PPP

Use of PPP in OF is only possible if they comply both with organic regulations and with pesticide regulations. Most of the heterogeneity between countries is due to pesticide regulations, and not due to organic regulations. It is determined largely by the policies of the registration authorities and of the companies, and is an area over which the organic sector has little influence.

Input lists

Input lists are guides for practitioners. They list branded products which are allowed for OF in a given country. Input lists are often prepared by certification bodies, but also by some other institutions, and they may be binding documents or for guidance only. As a minimum requirement, products must fulfil the requirements of both OF and PPP regulations (EU Member States: at EU and national level; non-EU-members: at national level). Most input lists are based on these minimum requirements, but some (e.g. OMRI list, FiBL list) are based on additional criteria. These can be:

- evaluation of inert ingredients
- necessity of use or
- socio-economic acceptability.

Evaluation of these criteria requires know-how which is different from that needed for conventional PPP registration.

Active ingredients

Active ingredients are regulated for OF by EC 2092/91, Annex IIB and in general by EC 91/414 (see paragraphs above).

Inert ingredients

At the moment, inerts are not regulated at Community level, either for OF or in the context of EC 91/414. However, substances of special concern (e.g. nonylphenols) can be regulated by other Community legislation. At national level, inerts are usually evaluated in the process of PPP registration, but not as part of OF regulations. Whether a compound is considered an active or an inert ingredient is largely dependent upon the manufacturer's claims.

Branded products

Branded products are approved for use at national level by the process of registration. Evaluation of branded products at Community level is unrealistic at present, because of the large number of products involved, and also because branded products are often adapted to specific, national needs in terms of crop production and of marketing and legislation.

Table 1: Regulation of different topics in Council Regulation 2091/91

Topic	**Article(s)**
Scope	1, 2, 3
Definitions	4
Labelling	5
Rules of production	6, 7
Inspection system	8, 9
Indication that products are covered by the inspection scheme	10
General enforcement measures	10 a
Imports from third countries	11
Free movement within the Community	12
Administrative provisions and implementation	13, 14, 15, 15a, 16
I. Principles of organic production at farm level	**Annex I**
A. Plant and plant products	I.A.
B. Livestock and livestock products (bovine, porcine, ovine, caprine, equine, poultry)	I.B.
C. Beekeeping and beekeeping products	IC.
II. Substances	**Annex II**
A. Fertilizers and soil conditioners	II.A.
B. Pesticides	II.B.
1. For plant protection	II.B.1
I. of crop or animal origin	II.B.1 I
II. microorganisms	II.B.1 II
III. to be used only in traps/dispensers	II.B.1 III
IIIa to be surface spread	II.B.1.IIIa
IV. other substances from traditional use	II.B.1 IV
2. In livestock buildings and installations	II.B.2
C. Feed materials	II.C.
1. plant origin	II.C.1
2. animal origin	II.C.2
3. mineral origin	II.C.3
D. Feed additives, substances, processing aids used in feedingstuffs	II.D
1. Feed additives	II.D.1
2. Certain products used in animal nutrition	II.D.2
3. Processing aids used in feeding stuffs	II.D.3
E. Cleaning and disinfection of livestock buildings and installations	II.E.
F. Other products	II.F

III. Inspection requirements	**Annex III**
General provisions	III.General
A. Production of plants, plant products, livestock and/or livestock products	III.A
A.1 Plants and plant products from farm production or collection	III.A.1
A.2 Livestock and livestock products produced by animal husbandry	III.A.2
B. Units for preparation of products and foodstuffs	III.B.
C. Importing of products and foodstuffs	III.C.
D. Contracting out	III.D
E. Production of feedingstuffs	
IV. Information to be notified by operators	**Annex IV**
V. Indications that products are covered by the inspection scheme	**Annex V**
VI. Processed products	**Annex VI**
Introduction	-
General principles	-
A. Ingredients of non-agricultural origin	VI.A.
1. Food additives, including carriers	VI.A.1
2. Flavourings	VI.A.2
3. Water and salt	VI.A.3
4. Microorganism preparations	VI.A.4
5. Minerals and vitamins	VI.A.5
B. Processing aids	VI.B.
C. Ingredients of conventional origin	VI.C.
1. Unprocessed or "simple-processed" vegetable products	VI.C.1
2. Processed vegetable products	VI.C.2
3. Animal products	VI.C.3
VII. Animals per ha	**Annex VII**
VII. Minimum surface areas	**Annex VIII**
1. Bovines, ovine and pigs	VIII.1
2. Poultry	VIII.2

Acknowledgements

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Comparison of the IFOAM Basic Standards, the Codex Guidelines, and the EU Regulation

Otto Schmid[21]

Items	IFOAM Basic Standards 2000	Codex Alimentarius Organic Guidelines 1999/2001	EU-Regulation 2092/91 for organically produced food
Scope	Food and non-food, including fish, textiles (new draft), fish etc.	Mainly food	Food and non-food
Conversion	Farm or farm unit, minimum 1 year before harvest, perennials 2 years	Farm or farm unit, minimum 2 years before harvest, perennials 3 years	Farm or farm unit, minimum 2 years before harvest, perennials 3 years
Landscape/ Biodiversity	Only a recommendation to national bodies (certain % of diversified areas)	Only a recommendation	Only a recommendation
Fertilization	Similar list, clear criteria list for new inputs	Similar lists, exclusion of manure from factory farming	Similar lists, only manure from extensive farming
Pest and disease control	Similar list	Similar list	Similar list
GMO products	Excluded	Excluded	Excluded
Animal husbandry	Rather detailed, developed as a framework for national organizations	Developed more as a framework for national bodies	Very detailed regulation, especially for poultry
Processing	Elaborated criteria list for new additives and processing aids, detailed list	Less developed criteria list, very restrictive list for animal products	Little developed criteria, no list for animal products yet
Labelling	Conversion label after 2nd year allowed. Mixed products with >95 % organic: full labelling; 70 % products: emphasis labelling; products with <70 % only on the ingredients list	Conversion label after 2nd year allowed. Mixed products with >95 % organic: full labelling; 70 % products: labelling on the ingredients list, only allowed on a national level	Conversion label after 2nd year allowed. Mixed products with >95 % organic: full labelling; 70 % products: labelling on the ingredients list

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About the 'ORGANIC INPUTS EVALUATION' project

The 'ORGANIC INPUTS EVALUATION' project is an EU Concerted Action project carried out under the Quality of Life Work Programme, 5th Framework Programme. It is funded by the Commission of the European Communities (QLK5-CT-2002-02565; full title: Harmonised and Standardised procedures for evaluation of plant protection products, fertilizers and soil conditioners for use in organic agriculture) and co-funded by the Swiss Federal Office for Education and Science (BBW 02.0113). The project lasts from January 2003 until December 2005.

The objective of this Concerted Action project is to develop recommendations for harmonized and standardized procedures for the evaluation of plant protection products, as well as for fertilizers and soil conditioners authorized for use in organic agriculture according to Council Regulation 2092/91. The project proceeds in three phases:

- Inventories of current evaluation procedures in the participating countries (separately for plant protection products and fertilizers and soil conditioners).
- Elaboration of standardized evaluation procedures (separately for plant protection products and fertilizers and soil conditioners).
- Recommendations for evaluation procedures and identification of research needs.

The following institutions are participating in this project:

- Danish Agricultural Research Centre for Organic Farming (DARCOF), Denmark
- Research Institute of Organic Agriculture (FiBL), Switzerland
- EcoS Consultancy, United Kingdom
- Istituto Sperimentale per le Nutrizione delle Piante, Italy
- Associazione Italiana per l'Agriculture Biologica, Italy
- Louis Bolk Instituut, The Netherlands
- Soil Association, United Kingdom
- Ludwig Boltzmann Institut for Biological Agriculture, Austria
- Austria Bio Garantie, Austria
- Associação Portuguesa de Agricultura Biologica, Portugal
- Universität Gesamthochschule Kassel, Germany
- Danish Plant Directorate, Denmark

For more information on this project, please visit the project website www.organicinputs.org.

Brian Baker is OMRI's Research Director. He has over twenty years of experience working in organic agriculture as a researcher, farm inspector, certification programme administrator, educator, and a provider of technical support to organic farmers. He grew up on a family farm in Upstate New York. After that, he coordinated the California Certified Organic Farmers (CCOF) certification programme and then developed CCOF's technical programme. He was the first employee hired by the Organic Materials Review Institute (OMRI) in 1997. He served on the National Organic Standards Board's Technical Advisory Panel, is member of the Standards Committee of the IFOAM, and has attended Codex Alimentarius meetings as a technical expert in the IFOAM delegation.

Francis Blake has over 25 years experience in the organic farming sector. He established an organic farm in 1976 and managed it for 10 years, before co-founding the UK Organic Advisory Service in 1986. From 1988 he was Certification Director of Soil Association Certification Ltd. (now the largest certifier of organic products in the UK), before becoming the Standards and Technical Director for the Soil Association in 1999. He is heavily involved in the development and promotion of international standards for organic agriculture and he is the President of the IFOAM EU Regional Group.

Rob Boeringa was involved in research and research management on organic farming between 1972 and 1995: on the committee for research into alternative methods of agriculture, the consultative body for organic farming of the Dutch National Council for Agricultural Research, and the Department for Science and Technology of the Ministry of Agriculture. He retired in 1995. At the moment he is a member of the Dutch committee for crop protection in organic fruit growing.

Rasmus Ørnberg Eriksen works at the Danish Plant Directorate within the Danish Ministry of Foods, Agriculture and Fisheries. He is the head of the group administering plant-related issues in organic farming in Denmark (since 2000). As technical expert of the Danish delegation, he participates at meetings in the working groups on organic farming under the EU Commission, DG Agriculture. He participated throughout the negotiation and development of common EU legislation on databases for organic seed, and is responsible for the Danish database. He has been involved in organic farming since his childhood and has experience of working both in organic farming and in greenhouse production. In 1999 he graduated as a Master of Science, Horticulture from The Royal Veterinary and Agricultural University (KVL).

Víctor Gonzálvez has been involved in several organic farming organizations in Spain since 1979. He also worked as extension agent at the Ministery of Agriculture and as advisor for organic farming in several regions. During 12 years, he worked as advisor for sustanaible and organic agriculture in Nicaragua and Central America, using horizontal dissemination methodologies for technology. Since 2000, he is the Technical Coordinator of the Spanish Society for Organic Farming (SEAE), and he is also advisor for the organic farmers section of the general farmers' organization (La Unió-Coag), dealing with organic standards. He represents the Spanish members in the IFOAM EU group, dealing with organic standards and policy work.

Rob Haward is the Horticultural Development Manager for the Soil Association, and specializes in horticultural sector development, market research across the organic sector and producer support. He facilitates and chairs a range of standards development committees and is involved in several UK MAFF (Ministry of Agriculture, Forestry and Fisheries) research and development projects covering organic horticultural best practice.

Alexandra Hozzank specialized in organic pest management. She is the co-ordinator of the Austrian inputs list since three years, and of the database infoXgen.com, which lists allowed inputs.

Alexandra Maurer da Costa has been working for the technical department of AGROBIO since 1999, as a technical consultant and editor of two bulletins ('A Joaninha' and 'Infobio'). She has been responsible for the coordination of technical information and updating of input lists, and is now responsible for training and education. She is the Portuguese delegate in the IFOAM EU Regional Group.

Cristina Micheloni has coordinated the AIAB Scientific Board since 1993. She specializes in soil fertility and plant production systems. She has been involved in standard-setting activity for the AIAB private label and within the IFOAM Standards Committee. She is involved in education, farmers' training, publishing and dissemination. She took part in several commissions at Italian Ministry level (General Commission on Organic Farming and Working Group on Plant Protection Products) and is involved in AIAB's inputs evaluation activity.

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Richard Plowright was the International Standards Manager for the Soil Association until 2004, and was involved in the area of equivalence and harmonization of international standards for organic agriculture. He has many years of experience in research in the management of plant parasitic nematodes, and has recently established an organic horticultural smallholding.

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Organic farming is characterized by a strict regulation of plant protection products, fertilizers and soil conditioners, which precludes the use of the vast majority of all available compounds. The European Regulation 2092/91 defines which substances are allowed in organic farming. Nevertheless, the range of products allowed varies greatly between countries.

The articles in this volume describe the evaluation procedures for plant protection products used in organic agriculture. They summarize the situation in various (mainly European) countries and the evaluation procedures and criteria of international institutions. The collection is not exhaustive, but it gives a picture of the areas where the regulations are similar across countries, and where there are major differences. It also shows the extent to which organic regulations/standards and (non-organic) legislation on pesticide usage are responsible for national differences.

The articles are based on presentations made at the workshop 'Inventory of existing procedures for evaluation of plant protection products used in organic agriculture', held on September 25–26, 2003 in Frick, Switzerland. The workshop was part of the EU Concerted Action project 'ORGANIC INPUTS EVALUATION', carried out under the Quality of Life Work Programme, 5th Framework Programme.

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