

● EDITOR LETTER	PAG 1
● EXPERT OPINION	PAG 2
● CERTIS ACTIVITIES	PAG 4
● NEWS AND NEXT EVENTS	PAG 6

EDITOR LETTER

THE VOICE OF CERTIS EUROPE FOR SUSTAINABLE FUMIGATION



Effective soil management remains a cornerstone of production of quality produce. Since the establishment of Certis Europe in 2001, Certis has focused on IP solutions for soil pest and disease management.

In 2003, Certis built the Cleanstart Programme that provided a complete solution to sustainable soil management combining cultural, biological and chemical approaches. Certis has continued to develop the approach adding new products and services to enhance the solutions for growers managing soil pests and diseases. In 2014, the Cleanstart approach, combines biological and chemical inputs with agronomic services and stewardship advice to provide sustainable soil management for the future that fits with the principles of the Sustainable Use Directive.

Many researchers and experts from across academia, extension services and industry work in this wide ranging field, and through the production of this Newsletter, Certis would like to provide a forum for sharing and debate of best practice and latest technical thinking on sustainable soil pest and disease management. We hope that this Newsletter will provide practical advice and information for users and officials alike, on the sustainable use of soil disinfection and its combination with the full spectrum of alternatives to embrace best practice in soil pest management.

We hope that you enjoy reading this newsletter and look forward to your feedback on our spring edition.

Jennifer Lewis

Head of Portfolio, Certis Europe.



PLANT PARASITIC NEMATODES: HOW CAN WE COPE WITH THIS PROBLEM OF AGRICULTURAL CROPS?

Nicola Greco

*C.N.R. - Institute of Sustainable Plant Protection (IPP),
Bari, Italy*

Among the pathogens and pests that affect agricultural crops an important group is that of plant parasitic nematodes.



Is damage caused by nematodes serious?

It is believed that the destructive effect of nematodes on life-sustaining crops may have been among the causes of migrations of entire human ethnic groups from one geographic region to another.

However, what attracted the attention of the first "nematologists" was the impressive and extensive damage nematodes were causing to the most important life-sustaining crops.

A true estimate of the damage caused by nematodes to crops at world or local level is not available. However, in the early 1980's, Sasser and Freckman conducted a survey among nematologists from all over the world and reported 10.7% yield losses caused by nematodes for life-sustaining crops and 14% for other economically important crops. On a world basis, they reported average yield losses of \$ 77 billion. Locally, yield losses caused by root-knot, cyst forming and stem and bulb nematodes can be as high as 50-70% and complete crop failure is frequently observed. The damage nematodes cause to crop plants can be even greater if other soil-borne pathogens (among others *Fusarium* spp. and *Verticillium* spp.), known to interact with them, are present.

To reduce the damage caused by nematodes, in the past, nematicides became the most popular because of the impressive yield increase following their application. Meantime, research was directed towards the search for resistance genes and their transfer in cultigens. Today a number of cultivars of tomato, potato and soybean resistant to *Meloidogyne* spp., *Globodera* spp. and *Heterodera glycines*, respectively, are available and extensively used.

Starting from the late 1970's, because of concern for the negative impact of chemicals on human health and the environment, there has been an increasing

reduction in the number of nematicides available, which has recently (2005) culminated in the withdrawal from the market of methyl bromide, a potent biocide routinely used under greenhouse and field conditions. More recently, the use of 1,3 dichloropropene (1,3-D), a chemical as effective as methyl bromide in the control of nematodes, has twice been refused inclusion in EU Annex 1, and is now used only under derogation periods of 120 days for a few crops. There are also restrictions on the use of the other nematicides available. This has stimulated investigations into non-chemical methods for the control of nematodes, but the degree of their nematode control is, generally, much lower than that of the main fumigant nematicides.

The use of resistant cultivars in many areas has resulted in the selection of different race/pathotypes of the nematodes toward which resistance is not available. Also, the intensification of the cropping system, the frequent cultivation of the same or similar host crop plants on the same land is exacerbating the existing nematode problems, while the globalisation of trade has caused the introduction into Europe of new damaging nematodes and diseases in general. This is the case of the pine wood nematode, *Bursaphelenchus xylophilus*, the soybean cyst nematode *Heterodera glycines*, *Globodera tabacum tabacum*, *Heterodera elachista*, and the root knot nematodes *Meloidogyne chitwoodi*, *M. ethiopica* and *M. enterolobii*.



*A potato crop showing patches of stunted and dead plants caused by a severe attack of the quarantine cyst nematode *Globodera pallida*.*

All these species, if they were to become established in Europe, would cause considerable damage to many crops. Moreover, the above-mentioned species of *Meloidogyne* have large host ranges and would also attack resistant plants.

The goals of nematode control

Because of the above, the adoption of proper control measures is necessary to limit yield losses caused by nematodes and to guarantee farmers of an acceptable profit.

To select the means of control basic information is necessary on: i) the exact identity of the nematode to control; ii) its population density in the soil; iii) expected yield losses; iv) efficacy and economics of different control methods; vi) biology and dynamics of the target nematode; vii) the presence of other soil-borne pathogens with which the nematode may interact.

Moreover, the strategy can vary according to the objective of the control. When dealing with annual crops, it will be sufficient to reduce the nematode population to non-damaging level or better just to its economic threshold. This simply means that it is not necessary to apply product rates greater than that estimated to reach these levels. The reduction of the nematode population densities below the mentioned levels would result in a waste of money and increased negative impact on the environment.

Much more difficult is the control of nematodes in perennials, such as fruit tree crops. In these crops control must aim at achieving as close as possible eradication of the nematodes.

What do we expect and hope for the future?

Expectations in the near future do not appear encouraging as nematode problems are expected to increase. Global climatic changes, especially an increase in average temperature, will allow the most damaging nematodes, *Meloidogyne* spp., to establish at higher elevation and higher latitudes while in areas already infested they would develop for a longer period of the year than in the past, thus leading to larger nematode soil population densities by the end of the crop cycle and, in turn, to greater damage to the following crops. The active ingredients having nematicidal activity so far available are only registered for use up until 2022 and the number of available nematicides is expected to be reduced. Also, the reduction of experts in nematology following the crisis across Europe, will certainly increase the severity of the nematodes that in many areas could be overlooked.

The most critical situation will occur in protected and nursery crops, for the production of healthy propagating material and in all crops for which quarantine issues must be considered. Third countries, even if they are part of the European and Mediterranean Plant Protection Organization (EPPO), may not be satisfied by the protocols according to which plant materials are produced in Europe and even a single nematode infecting a few plants would cause the rejection of the entire stock of propagating material. To remain competitive, all competing countries must have

available at least similar or preferably the same means of production, including effective solutions for the control of plant pathogens. The risk is that not only the high labour cost but also the lack of effective means of production, such as control solutions, will discourage nursery men from continuing their production activity in Europe and, instead, they will move to third countries thus aggravating the economic situation in Europe.



Tomatoes in a plastic house damaged by Meloidogyne spp.

Today not a single soil disinfectant is available in Europe that is as effective as methyl bromide against nematodes, soil borne-fungi and weeds. Therefore, mixtures or combinations of different chemicals must be used. In general, before undertaking the cultivation of propagating plant material, it is suggested that the land remains non-cropped or cropped with plants that are not hosts for the target soil-borne-plant pathogens for several years to reduce their population densities to undetectable levels. Moreover, the use of a biocide at relatively high rates, combined with one or more post-planting applications of non-phytotoxic chemicals, would be necessary to keep plants free of the target pathogens to avoid quarantine problems.

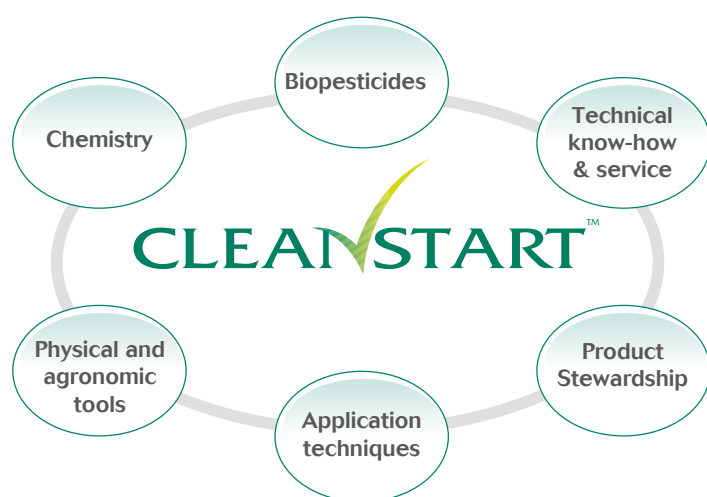
Unlike perennial crops, where the risk of chemical residues in the edible plant parts must be avoided, in the case of production of propagating plant material it is suggested that non-phytotoxic nematicides are applied until shortly before harvesting and selling them.

Because of the above, there is a great need for soil disinfectants that are effective against several soil-borne pathogens and that match the needs of farmers and of public concern for negative impact of agricultural activity on the environment and human and animal health. At present an ideal nematocide does not exist nor is it expected to be released on the market soon. Nevertheless, it is hoped that a soil disinfectant that is effective, cheap and safe, will be available in the next future.

CLEANSTART PROGRAMME AND SUSTAINABLE FUMIGATION

For more than ten years now Certis Europe has focused on IPM solutions and has developed its CleanStart programme dedicated to integrated soil pest management for growers of high-value crops. This IPM programme combines and alternates chemistry with different modes of action with the use of biopesticides, soil solarisation, biofumigation, soil mulching, resistant varieties and/or rootstocks, etc. for soil disinfection resulting in a reduced need for other post-planting chemical treatments.

The CleanStart strategy incorporates a stewardship programme, that makes possible sustainable fumigation respecting the environment and safeguarding human health.



Following the restrictions and phase out of some key soil fumigants over the past years, EU farmers have a clear need for new and sustainable solutions for soil pest management, especially against nematodes. Certis's portfolio of soil treatment products includes Basamid (dazomet), D-D Soil (1.3 D) Monam (metam sodium), Mocap (ethoprophos), Jet 5 (peracetic acid), as well as biological solutions such as Tusal (*Trichoderma* spp.), and other biopesticides under development, which are distributed under the CleanStart brand.

The new fumigant DMDS, currently under registration in the EU, will be part of Certis's future CleanStart portfolio in two formulations: Accolade EC (94.1%) for drip irrigation in protected crops and open field, and Accolade (99.1%) for shank application in field crops.

Recently, the pan-European CleanStart programme has been re-launched providing:

- Development and registration of new technical solutions for soil borne pathogens, in partnership with product manufacturers and research centres;
- Re-registration of active ingredients and formulations, already in our soil portfolio;
- Stewardship programme focused on soil fumigation;
- European and national communications on the CleanStart strategy.

As part of CleanStart, Certis has developed a pan-European stewardship programme to support sustainable soil fumigation practice, as well as appropriate measures to ensure safe use of products by minimizing their impact on the environment and human health.

The programme includes the following important points:

- compulsory training and certification for operators to apply the product safely for themselves, the surrounding residents and the environment, including the cleaning of small spills and leaks;
- introduction of Best Management Practice to understand Good Agricultural Practice for soil fumigation in general terms (soil and weather conditions) as well as specific product related subjects and issues;
- compulsory regular machinery testing on compatibility, calibration and maintenance;
- infrastructure and instructions for safe disposal of empty packaging and used tarping.

Arben Myrta, Rob de Vries



European stewardship training organised by Certis in Rome (Italy)

CLEANSTART ACTIVITIES IN SPAIN

Conferences of Certis Spain with experts on soil disinfestation

Major national experts on soil disinfestation participated in two CleanStart conferences in Spain in 2013.

The first, in April at the University of Almería, focused on protected crops. In this area of intensive production and sandy soils, soil disinfestation is a key measure to guarantee satisfactory quality and quantity.



Participants of the conference in Almería (Spain)

The aims of the first conference were twofold:

- to focus on the introduction of the new Sustainable Use Directive, which requires the use of integrated strategies for disinfestation of soils, using chemicals that are more sustainable and environmentally friendly.
- to demonstrate Certis solutions for farmers that conform to market demands and new production challenges.

Experts such as Dr. Julio Cesar Tello and Dr. Alfredo Lacasa discussed different disinfestation methods used over the years in Almería and Murcia, two of the main vegetable producing areas in Europe. They confirmed the increasing use of integrated management. According to expert nematologist Dr. Miguel Talavera, the losses mainly caused by *Meloidogyne* (*M. javanica* in tomato and *M. incognita* and / or *arenaria* in pepper) account for 30% of total production, with recourse to chemical disinfestation in 78% of cases.

Fungal diseases are tackled by the use of resistant rootstocks, but on many occasions, resistance failure has been reported.

Examples of alternatives to disinfestation in cut flowers were explained by the IFAPA technical team of Chipiona, highlighting their work in carnations, testing techniques such as biofumigation with Brassica pellets to supplement chemical disinfestation.

Dr. Giancarlo Polizzi from the University of Catania (Italy), presented various research programmes in soil pest management in protected cultivation in Sicily.

Certis has played an important role in establishing a knowledge network by bringing together the leading experts in soil disinfestation of Spain, Italy and France.

The second CleanStart conference at IFAPA in Huelva, in July, focused on strawberry, which is one of the key value crops for the province.

Here, the objectives of the previous session were expanded, introducing all the information related to “product stewardship” within the EU policy concerning pesticides and encouraging good management of the products included in the CleanStart programme, with special attention to soil fumigants such as Accolade or Basamid.

Leading experts and researchers in the cultivation of strawberries presented experimental data in soil disinfestation achieved over the last decades to technicians and producers.

Currently, soil disinfestation for strawberries is primarily chemical carried by soil injection or drip irrigation. However, the CleanStart programme from Certis offers an interesting opportunity for the combination of pre- and post-transplant solutions for soil-borne pathogens and nematodes.

After these two sessions, Certis Europe is definitely positioned as a reference company in soil disinfestation with involvement in training technical officers, spreading the stewardship programme for each of its products and always looking for alternatives, working in line with the new European regulation.

Maria Jesus Zanon, Nicola de Tommaso

NEW BOOKS ON SOIL PESTS

FUSARIUM WILTS OF GREENHOUSE VEGETABLE AND ORNAMENTAL CROPS

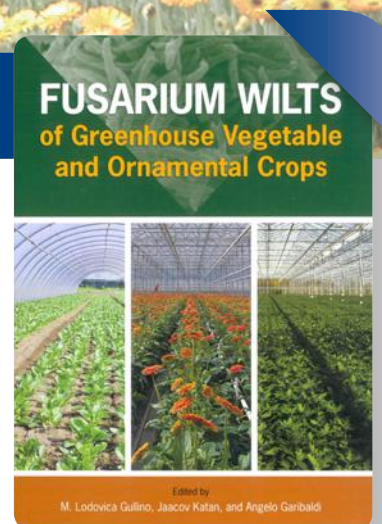
M. Lodovica Gullino, Jaacov Katan, and Angelo Garibaldi (Eds.)

Editing house: American Phytopathological Society Press

Year of publishing: 2012

Book: Hardcover; 256 pages; 69 images

Language: English



GENERAL AND APPLIED AGRICULTURAL NEMATOLOGY

(Nematologia Agraria generale e applicata)

Laura Ambrogioni, Francesco Paolo d'Errico, Nicola Greco, Anna Marinari Palmisano, and Pio Federico Roversi (Eds.)

Editor: Società Italiana di Nematologia

Year of publishing: 2014

Book: Hardcover; figures 98 in color and 136 B&W

Language: Italian

FORTHCOMING SOIL EVENTS

EIGHTH INTERNATIONAL SYMPOSIUM ON CHEMICAL AND NON CHEMICAL SOIL AND SUBSTRATE DISINFESTATION

July 13th - 18th, 2014 Torino, Italy



Organised by the Centre of Competence Agroinnova, University of Torino under the aegis of the International Society for Horticultural Science (ISHS, Commission Plant Protection, ISHS Commission Plant Substrates and soilless cultures, ISHS Working Group on Soil borne pathogens) and of the International Society for Plant Pathology (ISPP).

Considering the importance of this scientific international event on soil-borne pathogens, we requested an interview with the convener, Prof. Ludovica Gullino of Agroinnova - University of Turin, Italy

1. For how long has the University of Torino and Agrinova been involved in research on soil-borne pathogens and seeking control strategies?

The biology, epidemiology and management of soil-borne pathogens is a very popular research topic for the plant pathologists at Torino. The first studies were carried out in the 1960's by Professor Alberto Matta and Professor Angelo Garibaldi. Throughout the years, the research focused on different pathogens on various crops. At Torino, we always try to work on topics of interest for growers.

2. What are the main objectives of the next soil disinfestations symposium to be held in Turin 2014, and how different will it be from the last one?

The main objective is to update our knowledge on a topic which remains one of the most intriguing in plant pathology. Management of soil-borne pathogens is more difficult today than before. We have lost important chemical products and alternative solutions are not always as effective and easy to apply as the chemical ones were.

All SD Symposia follow a certain format. An important aspect of SD 2014 is represented by the fact that it will be organised under the auspices of two important International Scientific Societies: ISHS and ISPP. We will try to gather scientists with complementary interests. Finally, there will be a section of the workshop totally dedicated to extension services.

3. How many contributions and participants do you expect to have in the next symposium, and what is their relative geographical representation?

Do you want to share with us some more details of the next Symposium?

To date we have received over 80 contributions. This is a very good figure. The Symposium will be organised in different sessions (cultural practices, organic amendments, integrated control, chemical control,..). Each Symposium has its particular topics: at SD 2014 anaerobic soil disinfestation appears to be very popular!

4. How are you working with University programmes to train the plant pathologists of the future and make a bridge between basic research and applied plant pathology?

I'll answer without being politically correct. In our country, at the moment, we still have too many "Arabidopsis" scientists, concentrating all their efforts into too limited areas of plant pathology, spending most of their time at the bench and at the computer. They are not able to recognise a pathogen, unless they work on its DNA, and they do not know the host plant. Abroad there is already a reverse of this tendency. We need specialists, but we mostly need plant pathologists able to cope with the plant, the pathogen, and with all their interactions, especially considering that we need to teach and prepare the next generations of agronomists. At Torino we try to keep a balance between theory and practice. However, it is difficult. The new generations prefer to sit at a computer, without keeping "a foot in the furrow". Fortunately for us, we have very good young people able to go into the field, recognize pathogens, helping growers to make their decisions. At Torino, Giovanna Gilardi is a bright example of such expertise.

5. For the sustainable use of fumigants, you have recently been coordinating an important EU project, Life. Based on your experience and perspective, what are the key pillars for sustainable use of fumigants in the EU?

The LifePlus Project, coordinated by Agroinnova, dealt with the sustainable use of the few available fumigants. This means reducing their dose rates, thanks to improved application methods, integration with other non-chemical means (resistant varieties, biocontrol agents, physical methods,...).

To do so, very good experts are needed.

For more detailed information on this Symposium, please check at: www.sd2014.org

CERTIS EUROPE

Bld Woluwedal, 60
1200 Brussels
Belgium

Tel. +32 2 331 38 94
Fax. +32 2 331 38 60
E.mail: info@certiseurope.be
Website: www.certiseurope.com

CERTIS NETHERLANDS

P.O. Box 1180, 3600 BD
Maarsse, The Netherlands
Safariweg 55, 3605 MA
Maarsse, The Netherlands

Tel. +31 346 290 600
Fax. +31 346 290 601
E.mail: info@certiseurope.nl
Website: www.certiseurope.nl

CERTIS UK and BCP Certis

1 Riverside
Granta Park
Great Abington
Cambridgeshire CB21 6AD
United Kingdom

Tel: +44 (0)845 373 0305
Fax: +44 (0)1223 891210
E.mail: certis@certiseurope.co.uk
Website: www.certiseurope.co.uk

CERTIS BELGIUM

Bld Woluwedal, 60
1200 Brussels
Belgium

Tel. +32 2 331 38 94
Fax. +32 2 331 38 60
E.mail: info@certiseurope.be
Website: www.certiseurope.be

CERTIS ITALY

Viale J.M.E. De Balaguer, 6
21047 Saronno (VA)
Italy

Tel. + 39 02.96.09.98.3
Fax + 39 02.96.24.87.46
E.mail: info@certiseurope.it
Website: www.certiseurope.it

CERTIS FRANCE

5, Rue Galilée
78280 Guyancourt
France

Tel. +33 1 34 91 90 00
Fax. +33 1 34 91 90 09
E.mail: info@certiseurope.fr
Website: www.certiseurope.fr

CERTIS SPAIN

Elche Parque Empresarial (Bulevar Parque)
Calle Severo Ochoa, 18 2º- 03203
Alicante
Spain

Tel. +34 966 651 077
Fax. +34 966 651 076
E.mail: certis@certiseurope.es
Website: www.certiseurope.es
www.ceroresiduos.es

From the Editor

For any comment or suggestion related to this newsletter please contact **Arben Myrta** myrta@certiseurope.com
or **Nicola de Tommaso** detommaso@certiseurope.com