

**The protection in olive orchards: set up of technical assistance and phytosanitary appraisal [printed version also available in Arabic]**

**Barrani A., Hallak H., Nus B.E., Bashi A., Najm K., Abdallah Y., Contento F., Dubla E., Guarino A., Cardone G.L.**

*in*

Di Terlizzi B. (ed.), Dragotta A. (ed.), Jamal M. (ed.).  
Syrian national strategic plan for olive oil quality : final report

**Bari : CIHEAM**

**Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 73**

**2007**

pages 45-60

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=800336>

To cite this article / Pour citer cet article

Barrani A., Hallak H., Nus B.E., Bashi A., Najm K., Abdallah Y., Contento F., Dubla E., Guarino A., Cardone G.L. **The protection in olive orchards: set up of technical assistance and phytosanitary appraisal [printed version also available in Arabic]**. In : Di Terlizzi B. (ed.), Dragotta A. (ed.), Jamal M. (ed.). *Syrian national strategic plan for olive oil quality : final report*. Bari : CIHEAM, 2007. p. 45-60 (Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 73)



<http://www.ciheam.org/>  
<http://om.ciheam.org/>

## The Protection in Olive Orchards: set up of technical assistance and phytosanitary appraisal

A. Barrani<sup>1</sup>@, H. Hallak<sup>1</sup>, B. E Nus<sup>1</sup>, A. Bashi<sup>1</sup>, K. Najm<sup>1</sup>, Y. Abdallah<sup>1</sup>, F. Contento<sup>2</sup>,  
E. Dubla<sup>2</sup>, A. Guario<sup>3</sup>, G. L. Cardone<sup>4</sup>@

<sup>1</sup>GCSAR, Idleb, Syria

<sup>2</sup>CIHEAM-IAM Bari, Italy

<sup>3</sup>Regional observatory for the illnesses of the plants in Apulia Region, Bari, Italy

<sup>4</sup>Consortium of Defence and Exploitation of the Intensive Productions, of the Environment and Rural Territory of the Province in Bari, Italy

@Corresponding authors: a.barrani@maktoob.com, gianluigicardone@virgilio.it,

**SUMMARY** - During the implementation of the Program “Technical assistance for the improvement of olive oil quality in Syria” a specific activity has been focusing on IPM strategies and Organic production first appraisals in 4 main oil producing regions providing the 72,20% of the national olive oil production. 12 demonstration plots have been established and intensive training of 3 local trainees to act as responsible for the different domains has been delivered both in Syria (92 days/man) and in Italy (111 days /man).

Those first trials on main key pests and diseases affecting the olive tree in Syria (*P. oleae*, *B. oleae*, *P. unionalis*, *Z. pyrina*, *S. oleagina*) have been provided over 2 years, 2005 and 2006 and they represent a good base for further indications. Nowadays Syria is the first country in the area which has available a tested model of a regional phytosanitary bulletin, an IPM and Biotechnical calendar, trained Engineers at GCSAR Olive Dept. of Idleb as very skilled professionals at institutional level already in connection with international experts of the sector through a LAN with ADSL internet connection. All the related activities have involved both the Public extension (Min. of Agriculture) and farmers. Raising awareness on olive oil quality and sensibilization of the whole stakeholder (2.300 participants in 2 years) ) has been intensively done during the implementation phase. It is now necessary to take a further step in order to foster networking activities, to link information gathering among the different oil producing regions, with a particular focus on the accurate involvement of selected personnel at the Min. of Agriculture level. This Olive IPM national network can be considered a feasible step looking forward to ensure the necessary improvement of the olive oil quality in Syria.

**Keywords:** Technical assistance, monitoring, demo plots, pests, diseases

**RESUME** - Pendant la réalisation du projet intitulé: “Assistance technique pour l’amélioration de la qualité de l’huile d’olive en Syrie” des activités pionnières et spécifiques ont été mis en place dans le domaine de l’IPM et de la production bio dans 4 différentes régions où la production de l’huile d’olive somme le 72,20% de la production totale syrienne (Al Ibrahim, 2005). 12 terrains démonstratifs ont été établis par le projet et 3 Ingénieurs du CGRSA ont été formés pendant 2 ans soit in Italie (111 jours/homme) que en Syrie (92 jours/homme).

Ces premiers essais de monitoring IPM ont concerné les principaux ravageurs et maladies affectants l’oliviculture syrienne (*P. oleae*, *B. oleae*, *P. unionalis*, *Z. pyrina*, *S. oleagina*) avec la participation des agriculteurs et de leurs oliverais pendant la période 2005 - 2006. Ces premiers résultats représentent une base très fiable du point de vue méthodologique qui donne des indications très intéressantes pour le nécessaire suivie. Maintenant en Syrie il est disponible pour la première fois un modèle expérimenté du bulletin phytosanitaire régional, des calendriers techniques pour l’oliviculture IPM et BIO, un staff des Ingénieurs du CGRSA formés et expérimentés qui peuvent aussi compter sur une connexion internet ADSL à travers un LAN efficace et rapide, une connexion plus forte entre le GCSAR et les vulgarisateurs du Ministère de l’Agriculture qui a soutenu fortement les activités. Tous les activités relatives au domaine de la défense phytosanitaire ont été développées en très forte collaboration avec les Institutions publiques (Ministère de l’Agriculture) et les agriculteurs. Maintenant se rend nécessaire le renforcement des activités déjà entamées avec l’enlargement du réseau de monitoring IPM sous la coordination du personnel CGRSA déjà expérimenté et formé par le projet. Des activités des sensibilisa-

tion, information et formation ont été aussi réalisées pendant la période d'exécution (2300 participants dans 2 ans).

Dans ce cadre sera fondamentale l'engagement et la disponibilité du Ministère de l'Agriculture pour l'activation du personnel déjà opérationnel dans les bureaux régionaux. Cette première étape dans la formation du réseau National pour l'IPM et le monitoring peut être considéré le pas plus logique à faire tout en suivant les chemins ouverts par le projet.

**Mots clés:** Assistance technique, monitoring, terrains démonstratifs, ravageurs, maladies

## Introduction

The "Program for the Technical Assistance for the improvement of olive oil quality in Syria" had, among its final objectives, the goal to increase the production of virgin olive oil and to reduce the lampanate oil, by the organization of a quality supply chain. This must be done through properly managed olive production. Oil quality has to be intended as "a healthy and clean olive fruit", then in good phytosanitary situation, harvested in the best period and using appropriate harvesting tools.

Moreover, it is best to transport olive at 'just in time' to safeguard it from crushing and overheating. Only if all the rules of good agricultural practice are adopted in the field is possible to have a fit olive, which makes an olive oil of quality when milled.

The program has provided therefore the support of Italian experts about the integrated and organic protection, and it has had the following objectives

- To train the technical staff working in the GCSAR on the methodologies of surveying, of monitoring, of acquired data processing and, finally, of dissemination of the information in olive areas;
- To implement, to organize and to manage a service of technical assistance, constituted of a net of representative demo fields in the different olive areas, and of a net of meteorological stations. The staff of GCSAR technicians has to be able to monitor the principal diseases, insects, bacteria and viruses of the olive tree, to store the data from the field and to process it to give the correct suggestions to the farmers in a short time;
- To organise the tools for distribution of technical information such as an agro-meteorological and phytosanitary weekly bulletin, a green calendar for integrated and organic agriculture and a brochure on phytosanitary control;
- To cooperate, also on-line, with the Syrian technicians to resolve phytosanitary problems, which are observed in the demo fields;
- To manage a plan of verifications and controls of activities in the field and in the GCSAR;
- To organise workshops, training days, conferences and seminars.



Photo 1: Training session

## Project related activities

The program of improvement of the quality of the olive oil in Syria has foreseen a preliminary training activity that is addressed to the Syrian technicians of the GCSAR, with the objective of providing an updating of the state of the Italian scientific search on the control of the most important insects and diseases of olive growing. To be able to identify the centre of the demands of the Syrian olive growing, it has been necessary for a mutual preliminary exchange of information between the technicians of the two nations about the method of integrated and organic agriculture, especially about technological, soil, climatic, cultivars, social, economic and cultural differences. The programme has been concerned not only with control, but also fertilization, tillage, pruning, irrigation, harvesting. The initial mutual exchange of news has been important, because it has allowed the Italian expert to interpret the choices and the demands in terms of phytosanitary control.

In the first missions, Italian and Syrian experts have confronted each other the problems of control of the principal pests: particularly on the cycles of the principal insects and fungi, the correlations between pest and climate and the economic thresholds. Practical activities have been undertaken in the demo field: demonstration of the techniques of monitoring, application of the sexual traps, besides, compilation of the schedule for weekly registration of observation in the field. The Italian experts with relative guidelines have elaborated the schedule.

The Italian experts have also prepared some electronic sheets on computer support, to insert the technical information, which are observed in the demo fields. Therefore, the data bank is used to get some tables and graphs immediately on the curve of the flights and on the infestations of the principal insects. The final objective has been that to have the phenological phase and phytosanitary situation from the demo field weekly in relative representation of the different olive areas.

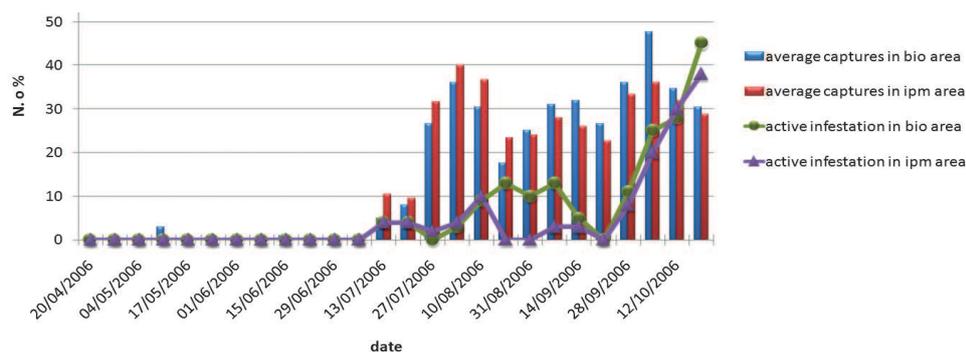


Chart 1: Sample of a flight curve of *B. oleae* in the Lattakia demo plot (IPM)

The Italian experts have also prepared an agro meteorological and phytosanitary bulletin that olive farmers can read easily.

Weekly meetings have been organized with the GCSAR technicians to draft the bulletin. The bulletin supplies the short-term weather forecasts for 4-5 days (the news has been taken from the main national and international dedicated websites), it also supplies the phenological phase, phytosanitary situation and control advice. By common consent with the GCSAR, Italian experts have also defined the means for bulletin distribution that happens through fax or by hand delivery to the places of farmers' meetings and institutions.

Besides, the direct thread, on line, among the Syrian technicians and the Italian experts, has allowed a useful and continuous interaction.

The Italian experts have also visited several times the 12 project demo fields established and followed up by the GCSAR Engineers. The objective was to check the proper implementation of the monitoring/sampling methodologies and the correct application and distribution of the control advice to the fields' owners.

Within each one of the 4 olive areas where the demo plots were established, a limited zone has been located near the IPM demo plots to apply methodologies for organic production in olive orchards.

During the visits some analysis has been undertaken and discussions held particularly about the application of the sexual or massive traps, about the sexual confusion technique, about the methods of control of *Bactrocera oleae*, *Zeuzera pyrina*, *Verticillium*, *Palpita unionalis*, *Spilocaea oleagina*, about the use of the pesticides in the respect of the integrated agriculture. Traps for mass trapping have been applied to control of *Bactrocera oleae*. The GCSAR technicians have also prepared some traps using PE mineral water bottles. These traps have been applied in ratio of one per tree in the middle of the field and in ratio of 2 per tree all around the plot. In the top of the bottles, some holes of around 1 cm diameter size have been made. The bottles have been then filled with a solution of mixture of deltamethrine (0,1%), sulphate ammonium 20% (4%), sugar (2%). For a comparison, more bottles have been filled with hydrolized protein (3%). The hydrolized protein is commonly distributed for free from the Ministry of Agriculture in Syria. For the weekly monitoring of the pests' flights, the sexual traps have been used: type Dacotrap for *Bactrocera oleae*, type Traptest for *Prays oleae* and *Palpita unionalis*. While, the sexual traps type Mastrap L. have been installed for the monitoring of the adults of *Zeuzera pyrina*.



Photo 2: Traptest

For the monitoring of infection of the *Spilocaea oleagina*, a demonstration has been done at the GCSAR laboratory in Idleb using a solution of sodium hydroxide where leaves have been dipped.

Cross control for the percentage of attack of *Bactrocera oleae* has been also carried out. With this intention, the Italian expert has taken some olive fruit samples in the four principal olive areas either in field or in mill to check on the phytosanitary situation in Syria, during the period harvesting.

In some missions, together with the GCSAR technicians, Italian experts have attended a total of 12 public meetings with a total of 251 participants (local farmers and technicians, stakeholders) with relative discussion on the following topics:

- Italian olive growing in integrated and organic agriculture
- the public and private technical assistance in Italy
- importance of the quality, of the quality labels and certification requirements
- importance of the environmental protection and the human safety in agriculture
- news about the control of *Zeuzera pyrina*
- news about economic thresholds, harvesting techniques, pesticides, pruning techniques, protection of the environment and the operator, mechanization of the principal agricultural operations, production costs, organic and mineral fertilization, characteristics of the different cultivars, farmers' association, etc.

Antonio Guario, senior IPM expert, has also delivered a speech at two conferences:

- 1) "Technical Assistance for the Improvement of Olive Oil Quality in Syria", in Idleb, in 2005;
- 2) The Italian technology in the chain of the olive production, in Homs, in 2006.



Photo 3: An Italian expert during field monitoring

On the occasion of the second conference in Homs, both the Italian experts have attended useful round tables with Syrian technicians and Italian Societies of Technical Means. There have been discussions, and some technical-commercial relationships have been opened up between the two countries.

## Results

During the visits at the demo plots and the olive farms, the Italian experts in the presence of the GCSAR technicians and the farmers have attended formative meetings and conferences. In conclusion, the Italian experts have acquired a more complete general knowledge on the different Syrian areas (Afrine, Idlib, Lattakia, Homs, Tartous). This has been fundamental in being able to interact with the local technicians and to discuss the subject of control and of technical growing.

The acquired results are summarised in the following points:

- **Correlations between climate and pests**

The influence of the different macro climates in the different areas of the Syria have been put in correlation to the biology of *Prays oleae* and *Bactrocera oleae*, also underlining possible difference between Italy and Syria. There are important differences between the inland Syrian areas and that coast. In fact, in the inland the daily average temperatures in the summer period are generally above 32° C, with consequent arrest of the activities of *Bactrocera oleae*. In the coastal area the mild climate allows a great number of generations and accordingly of infestations. In a lot of areas, there is the difficulty to know historical climatic information in real time that is important to elaborate the correlation of climate with pests and diseases. Therefore, some meteorological stations have been installed to provide rainfall, temperature and humidity.

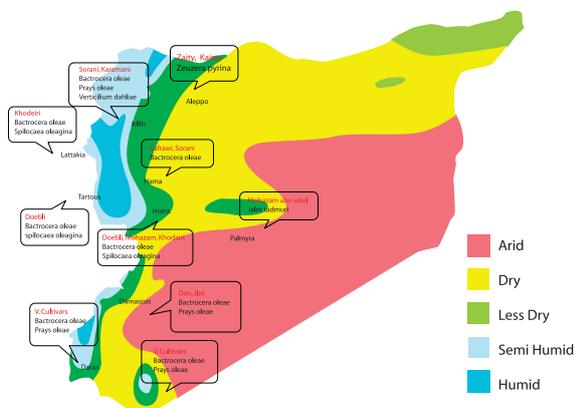


Chart 2: Bio climatic map of Syria

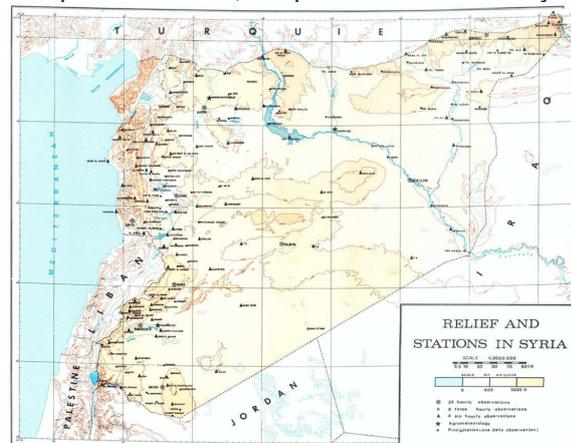


Photo 4: Meteorologic stations in Syria

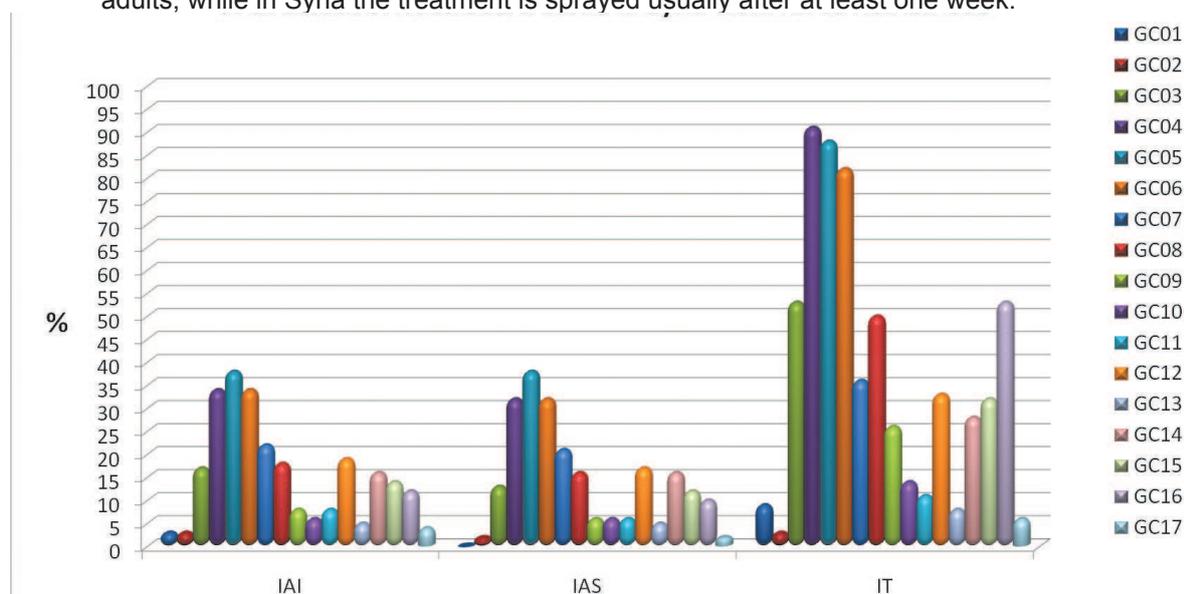
- **Technical-economic information, in particular, on pest management**

The GCSAR Engineers have underlined the following aspects:

- Low cost of manpower, fuel, high cost of pesticides;
- Low mechanization level (treatments, pruning, harvesting);
- Low specialization of olive growing in some regions, especially in the oldest, for the presence of different aged trees;
- Absence of any type of recording about farming operations, accounting, etc;
- Long waiting time between harvesting and milling;
- Good yield in oil and high qualitative variability of the olive oil, especially in Sorani cv;
- Good oil price of sale in local market, often higher than international one;
- Low contractual power of the farmers for export since olive farmers' associations are not common;
- Olive oil is sold directly from producers to the final consumers or to the middlemen in the same villages;

- **Phytopsanitary appraisal in the olive orchards**

Several visits to the olive orchards have allowed evaluation of the presence of pests and diseases. The monitoring of key pests has facilitated the implementation of better management of the related control strategies in the 4 different areas (Afrine, Idleb, Latakia, Homs) where the project has concentrated its attention. In the last years, an increase of presence of *Zeuzera pyrina* has been noticed. The discussion with the Syrian technicians on the biological cycle of *Zeuzera pyrina* has allowed identification, with good precision, of the moment of the single treatment against the larva. In Syria, the period of development of the eggs and the larva's first stage is shorter than in Italy. This factor is of crucial importance, considering the high efficiency and long persistence of the dimethoate against adult and young larva. Therefore, Italian experts have advised the earlier time of treatment at the period of high presence of the population of adults, while in Syria the treatment is sprayed usually after at least one week.



GC01-02 = Idleb; GC03-07 = Lattakia; GC08-13 = Afrin; GC14-17 = Homs  
 Farms with at least a treatment against fly: GC01, GC03, GC09, GC10, GC11, GC17  
 IAI = Active attack according to Italian method (eggs + alive larva counted)  
 IAS = Active attack according to Syrian method (alive larva counted)  
 IT = Total attack

Chart 3: Percentage of attack of *B.oleae* in different Syrian regions

During two years of monitoring, a lot of information has been to acquired by local technicians and by farmers in the different areas as following:

- Idleb: conditions of soil, climate and olive cultivars do not determine generally great phytosanitary problems for *Bactrocera oleae*, *Phloeotribus scarabeoides*, *Euphyllura olivina*, *Parlatoria oleae*, *Spilocaea oleagina* and *Mycocentrospora cladosporiodes*. On the contrary, the important infections noticed have been *Prays oleae*, *Verticillium* and *Zeuzera pyrina*. No treatments have been done in these demo plots.
- Latakia: The climate is Mediterranean type, mild and humid. Therefore, it is the area with high presence of *Bactrocera oleae* that is not well controlled generally by suitable spraying. Besides, the situation in the area of Tartous is even worse for the presence of more susceptible cultivars (for example Doebli with an average-big sized fruit) than in Latakia, where cultivar Khoderi (medium size) prevails. The presence of *Spilocaea oleagina*, *Mycocentrospora cladosporiodes*, *Zeuzera pyrina*, *Euphyllura olivina* is high. The presence of *Prays oleae*, *Saissetia oleae* and *Parlatoria oleae* is less remarkable. 2 sprays with dimethoate have been necessary in Latakia I PM demo plots, one for controlling *Prays oleae* (4/5/06) and the second one to control *Bactrocera oleae* (17/8/06).
- Aleppo - Afrine: Climatic conditions are characterized by low humidity and temperature pattern that favours delayed maturation. This situation does not favour the attacks of *Bactrocera oleae*, especially in the period of the colour breaking. Besides, the high presence of the cultivar Zaity (small size) doesn't favour the strong infestation of the *Bactrocera oleae*. The table olives (cultivar Kaissy) have initially a small size, and only thanks to the autumn rains this fruit enlarges remarkably. The presence of *Zeuzera pyrina*, *Parlatoria oleae*, especially in the table olives, and *Phloeotribus scarabeoides* is quite average. The presence of *Spilocaea oleagina* and *Mycocentrospora cladosporiodes* can be considered normal. No treatments have been done in these demo plots.
- Homs: *Bactrocera oleae*, *Prays oleae*, *Zeuzera pyrina*, *Palpita unionalis*, *Spilocaea oleagina* and *Mycocentrospora cladosporiodes* aren't particularly favoured by the climatological conditions, therefore, their attacks and infections are not generally high. Only in demo plot 2 have been noticed very high active attacks of *Bactrocera oleae* and *Prays oleae*, due to particular micro-climate conditions and less probably to the sensitive cultivars which are the same as plot 1. On 28/6/06 1 spraying against *Prays oleae* has been necessary in the IPM demo plots, another treatment on 20/9/06 has been necessary to control *Bactrocera oleae*. Both treatments have been done using dimethoate. On 5/7/06 1 spraying against *Palpita unionalis* has been necessary in the BIO demo plot using *Bacillus thuringiensis*.

The first observations of olive orchards in different regions have allowed verification of the influence on the phytosanitary situation of the following factors:

- Pruning method: Especially in the olive areas of Latakia, Idleb and Homs, pruning is characterized by the necessity to give to the canopy a globe shape, because it is necessary to avoid that the solar rays entering inside and directly scorching the main primary branches. Such a system of pruning does not favour the circulation of the area, facilitating as well the stagnation of humidity inside of the canopy. The high humidity increases the infections of fungi such as *Spilocaea oleagina*. The dry climate, infertile soil, low fertilization and other agronomic factors favouring water stress to the tree, therefore, farmers prune every two or three years and alternate bearing is high, especially in the Lattakia area. During the year of low production the olives reach great size that increases susceptibility to the attacks of *Bactrocera oleae*. Despite this farmers do not increase treatment with pesticides since they wait for the natural fall of olives, then they harvest them from soil with double damage: a) the possible increase of focuses of *B.oleae* attacks in that field; b) poorer oil quality.
- Fertilization method: there is an insufficient distribution of chemical and organic fertilization. Few farmers apply fertilization, but they don't plan it carefully and soil analysis is rare.
- Irrigation method: except some zones of Aleppo, the irrigation is practiced rarely. For this, there is water stress, particularly, in foreign cultivars that allow a state of deterioration of

trees. In this case, there is a higher colonization of pests and fungi such as *Phloeotribus scarabeoides*, *Hylesinus oleiperda*, etc. because they attack the trees in a poor vegetative state

Pesticide application: During some visits, the Italian experts have observed immediately after treatment, that the pesticides have not had a good efficacy against the pests and diseases targeted. The reason is attributable probably to the unobservance of the recommended doses, or to not uniform distribution of the pesticides on the trees. This last eventuality could probably be caused by inefficient spray machinery. Treatments by tank hauled by a tractor or using a shoulder hand-pump sprayer are the most used means in Syria. Atomizer is expensive.

- **Economic threshold**

Italian and Syrian experts have defined the most suitable variables for the sequential methodology in Syria through the elaboration of the economic thresholds about the most important pests in the different studied areas. In fact, it is necessary to consider a lot of factors such as main regional climates, the spontaneous and induced mortality of larva, the olive fall caused by larva, the accuracy of monitoring and sampling, human error, the cost of harvest and transport, the cost of milling, the cost of a specific treatment, the market price of means, the sale price of olives or oil, etc.

The analysis has allowed defining in Syria the following:

- It is not necessary to determine an economic threshold for the “flower generation” of *Prays oleae*, in use in Syria. The technicians have concluded that, after many years of experience in the field, this generation does not need to be treated; therefore there is no need for an economic threshold.
- In dry and warm areas, the eggs of pests do not need to be considered for the calculation of the active infestation in the economic threshold of both pests: *Prays oleae* and *Bactrocera oleae*. In fact, according to the local technicians, the high temperatures and the dry climate cause high mortality of the eggs in dry and warm areas. Therefore, it has been advised to re-calculate the economic threshold at least in the two main different climates (coastal areas and inland). The suggested threshold for *B. oleae* can be 10-15%, while for *Prays oleae* the considered suggested threshold is 7-10%, in fact the Italian experts have considered too high the economic threshold of the “fruit generation” of *Prays oleae*. As regards this subject, the Syrian technicians have stated that is important to reevaluate the economic threshold for the different areas.
- It is advisable to undertake a newer and deeper applied research about climatic, technical-economic and agronomic factors which affect differently the thresholds for key insects, in the different olive areas. This activity can easily be carried out by the Syrian GCSAR Engineers.

- **Pest control service**

The visits in several zones have underlined a low use of pest control (Chart 4), in fact, olive farmers apply few chemical treatments and use few active substances.

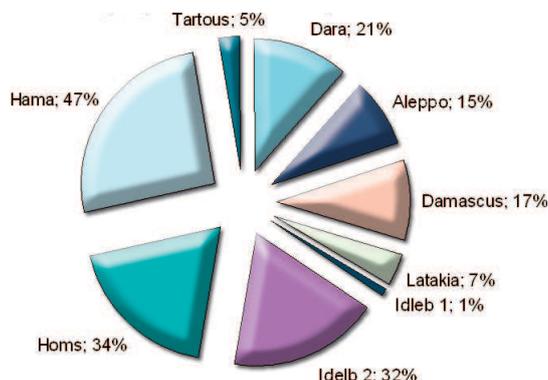


Chart 4: Syrian olive farmers using pesticides. (Source: *Project Survey 2005-6*)

In general farmers do not spray the trees easily. In several areas, the chemical treatments are not applied even if there is a strong diffusion of the pests that cause loss to quantitative and qualitative final production.

For the control of *Bactrocera oleae*, the active ingredient dimethoate (28 days security time) and pyrethroids are the most commonly used and sold in pesticide shops spread all over Syria. Almost exclusively. Italian experts have advised the use other active substances too and to pay attention to the use of pyrethroids since they are not selective and can negatively affect the activity of useful insects that have been observed in Syria through different studies. Eight parasitoid specimens on *Bactrocera oleae* ("Seasonal abundance of the olive fruit fly *Bactrocera oleae* Gmel. and its parasitoids in northern Syria" Yakti, A.S. Bakri, R. Alnajjar, A. A. Aljaafar - 2001) and 8 parasitoids on *Prays oleae* have been observed in 2001 (Impact of parasitoids of the phyllophagous and antophagus generation of *Prays oleae* (Olive moth) larvae, in northern Syria (A.M. Aljafar, A.S.Bakri, R. Yakti - 2001)

In case it is necessary to treat a few days before harvesting, farmers might apply – if available in Syria - pesticides with trichlorfon as the active ingredient. This pesticide has 10 days as security time. When a suitable plan of chemical control is recommended by the technicians, it is not applied by farmers, phytosanitary problems become greater and greater and this means a stronger action in terms of chemical struggle is required to control a more difficult situation, that causes, consequently, an environmental imbalance and damage to the useful insects. New methods of control have been applied in Syria such as the mass trapping with feeding traps. During the first year the monitoring activities in the field have not been easy. The constant support of a long term junior expatriated expert in Syria has allowed the results to improve remarkably.

- **Traps and their use**

The use of biotechnological means is rare, for example massive traps or "attract and kill". Their high costs mean they are used essentially for the purpose of search or of monitoring in the demo or experimental plots. It is advisable to increase the distribution of traps for monitoring and control of the harmful insects. A demonstration of their utility with the possible economic support from Syrian Government should be carried out in future. In organic olive demo fields, traps have been used for the massive capture that are made with mineral water bottle in PE and activated with a solution of ammonium sulphate (4%) sugar (2%) and deltamethrine (0,1%) (they have been hung at the rate of two per tree in the borders and one per tree inside the plot ).



Photo 5: Filling the bottle traps for *B. oleae* used during the project implementation



Photo 6: Mass trapping bottle installed on the tree

Subsequently, these traps have been compared with bottle traps that contain only hydrolysed proteins (3%) to increase attractive power of the traps towards the adult of *Bactrocera oleae*. The proposal of the Syrian technicians not to use dimethoate or deltamethrine in the mixture of the plastic bottles, has proved correct because of the high cost of pesticide and the high probability that the adults will remain imprisoned inside the bottle do not make economic the application of pesticide. In conclusion, the use of the feeding traps for mass trapping has shown encouraging results with an average capture of 5 flies per week/bottle. No difference has been remarked between the hydrolyzed proteins and the ammonium sulphate traps. Considering that

the hydrolyzed proteins are free for farmers and that the solution is easier to prepare, the final advice is to use this active ingredient to activate mass traps.

In coastal areas, the implementation of organic agriculture (Latakia and Tartous) may achieve very poor benefits, for two main reasons:

- i) high frequency of severe infestations of the main key pests that cannot be controlled by organic biotechnologies only;
- ii) the few efficacious methods are still very expensive for Syrian farmers.

At the moment, in those areas it is still preferable to intervene in a rational way (with regard to the economic threshold and with the maximum respect of the security time) with conventional active substances (dimethoate) to get a product of high quality, repeating the spray twice if necessary.

• **Schedule of survey and data bank**

The Italian experts have elaborated phenological and phytosanitary schedules for the monitoring technicians. The timelines for storage of information from the weekly survey in databank has improved during the period of the activity. At the beginning, transfer of the information from GCSAR Engineers and local extensionists was slow and difficult. Subsequently, the peripheral offices and extensionists of MoA were been involved, and have collaborated well to achieve a more capillary service of assistance in olive areas, and to improve the dispersion of information, through the bulletin and other means of distribution.

The documentation of the surveys has been filled in a way to provide a quick response. In this way, it has been possible to keep under control the situation of the demo fields and proper tracking of the field operations. Italian and Syrian experts have produced some technical documents (posters and brochures) about good agricultural practices and about the techniques of pest control. Such material has been distributed in several public and private events that have been organized by project, and the technicians and the farmers have taken an interest them.



Photo 7: IPM Poster



Photo 8: IPM Brochure

• **Demo plots network**

The group of experts has located 4 olive key areas (Idleb, Aleppo, Homs, Latakia) where more than 70% of national olive oil production is done and in each area 3 demo plots have been established. The total 12 demo plots were 0.5 hectare and have been useful to monitor olive areas and to get key information for the weekly phytosanitary bulletin. The demo plots have been chosen as representative of the concerned regions. Therefore, the choice has not been easy, because the GCSAR Engineers had been involved in considering the representivity of the olive

area, but also the Syrian organization, the availability of the personnel and the mechanization level of the pilot farmers involved. In the choice of the fields, the preference has been also given to those in which it is possible also to consider a zone for organic olive farming. In the single fields, the pheromone traps have been installed to monitor the presence of the adult pest weekly and the technicians have marked some trees with red paint in order to use them for monitoring during the whole productive cycle.



Photo 9: A Syrian expert monitoring *B. oleae* in the project demo plot

The final results of monitoring about 12 demo fields have been as following:

- Collecting information about insects, diseases, virus, etc., and meteorology in olive areas and storing these in a data bank;
- Elaborating acquired data for drafting the phytosanitary bulletin;
- Improving-updating skills and abilities through intensive experience in weekly monitoring;
- The involvement of local pilot farmers to follow the advice of GCSAR and MoA Engineers for the improvement of olive oil quality.

• **Agro-Meteorological and phytosanitary bulletin**

The result of the job of field technicians, those in charge of GCSAR, the Italian technician in Syria with the coordination of the Italian, has been the bulletin. Initially as the bulletin evolved, the Syrian technicians saw it as of little consequence, but subsequently they quickly understood its important function and that it is a fundamental tool for dissemination of the objectives of technical assistance.

<p><b>CLIMATIC AND PHYTOSANITARY BULLETIN</b></p>	
To:	Date:
<p><b>General idea of the project:</b>          Monitoring and advising about olive insects and diseases control          • Seasonal management of integrated olive management, milling and storage of olive oil          • Study and organic analysis laboratory for olive quality          • Training to technicians</p>	
<p><b>Monitoring olive grove area, for further information please contact:</b></p> <p>Altopro-Artline responsible Eng.          Name: responsible Eng.          Mobile: responsible Eng.          WhatsApp: responsible Eng.</p>	
<p><b>Weather forecast of Short Term from 00/00 to 22/00/2000:</b></p> <p>Altopro-Artline:          Name:          Mobile:          WhatsApp:</p> <p><b>Phytosanitary phase:</b></p> <p>Altopro-Artline:          Name:          Mobile:          WhatsApp:</p> <p><b>Phytosanitary situation:</b></p> <p>Altopro-Artline:          Name:          Mobile:          WhatsApp:</p> <p><b>Control advises:</b> (in case of diseases, insects, virus, and not already the control):</p> <p>Altopro-Artline:          Name:          Mobile:          WhatsApp:</p>	
<p>Signature of responsible technician</p>	
<p>02030 - Italia/Syria Olive Research/Department - Box 37 - e-mail: nmoa-lee@csar-organ.it          Tel. +963 23 248602 Fax. +963 23 233 703</p>	

Chart 5 and 6: Phytosanitary bulletin

The simplicity of consultation, the immediateness of reading about information have had an enthusiastic response from all the local involved personnel in terms of share in the draft, but also in the increase of the demand for consultation. With regard to distribution, the GCSAR has involved the Ministry of Agriculture and its peripheral offices. The bulletin has been spread through the mosques and the town offices. However, it is advisable to extend and distribute this document more and more via the use of proper mass media and subsequently for such actions as for example, dispersion of news, of the control programs. It is important to avoid the failure to follow up and ensure proper application in the field of the technical suggestions contained in the bulletin.

- **Green calendars on the integrated and organic olive farming and oil production**

The technicians of the two countries, with experience of several disciplines, have composed a dedicated working group with the aim to produce two calendars (IPM and BIO) where the main subjects of the olive production chain are briefly summarised per month according to the olive producing area and taking onto account the different climates and phenology of the olive tree in the Syrian region where olive tree is distributed. Monthly information about tillage, fertilization, pruning, pest control, harvest, transport, milling, and storage is given. The two calendars are a means of easy consultation and an effective visual impact; they can help farmers during the whole year with the technical choices for achieving oil of quality.

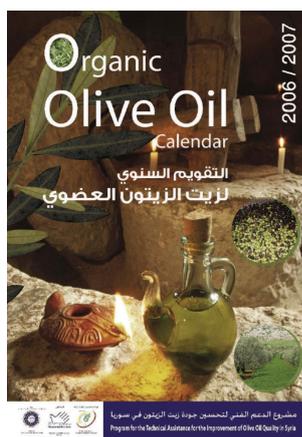


Photo 10 and 11: Organic and IPM Calendars

- **Training in Syria and in Italy**

Three GCSAR Engineers (2 for the quality plan management and 1 for IPM network management) attended some instructive training programs in Italy, for a total of 111/days man: Training theoretical and practical sessions were held particularly in the Apulia, Basilicata and Umbria regions. Training programs were intended to upgrade and update the technical knowledge about agronomic subjects, organization and management of the technical assistance and applied research service. In fact, they have visited public and private institutes of research and /or for extension/ technical assistance (Faculty of Agriculture in Bari and in Perugia, Regional observatory for plant diseases of Apulia, Mediterranean Agronomic Institute in Bari, Association among Consortia of Control and Exploitation of the Intensive Productions in Apulia Region), certification bodies (Ethical and Environmental Institute for Certification), private and associate oil mills, olive farms, professional olive growers' unions (Regional Federation of Apulian Farmers), Olive farmers associations (Asso.pr.oli.), laboratories, pesticide showroom. 14 dedicated trainings on IPM and BIO have been held all over the Syrian territory, involving the GCSAR Engineers as tutors and with a total of 314 participants among engineers, farmers and interested stakeholders.



Photo 12: Training in Italy

In the future, the same Engineers will be able to implement a certification system, promote and raise awareness on eco-sustainable olive growing with the follow up and continuous online collaboration with the Italian experts.

- **Workshops**

During workshops held in Syria, a high number of participants were present (more than 2300 persons in two-year program), but also there has been a high amount of interaction during the discussion. Also on these occasions, there were interesting exchanges of opinions and of experiences between technicians or operators.

## Conclusions and Recommendations

Syrian olive growing needs the investment of economic and human resources to achieve an integrated and organic production of quality. Therefore, a great exchange of knowledge and important research are necessary. Only, quality production can develop the certification, the product tracability and marketing, according to the protocol for integrated and organic production. The quality system has also to ensure the environment, the health of the consumer and of the farmer himself. In Syria, the quality system has a positive future, because there is:

- High margin of improvement of the technical management;
- High margin of improvement of the technical assistance to the farmer;
- High margin of improvement of the quality production;
- High degree of attention for the environmental problems and of respect of the useful insects;
- High degree of attention from the technicians to news and research;
- High margin of increase in difference between benefits and costs, by the improvement of quality production;
- Enough labour supply, that has to be trained by instructive courses;
- High margin of improvement of computerization.

The quality plans of rural development have to have the following objectives:

- To transfer the information from the rural world to the search and vice versa;
- To train technicians and farmers;
- To acquire and to process the statistical data (climatological, economic, agronomic, etc.);
- To develop an in-depth study to characterize the rural territory in homogeneous areas with regard to economic thresholds, climatological typology, soil type, olive cultivars, presence of the principal pests, production costs, quality oil, agricultural income.

Only permanent training and research can help the development of Syrian olive growing in an

average time.

The missions in Syria of the Italian experts have allowed them besides to reach the following conclusions of a general character:

- The phytosanitary monitoring has confirmed that in the inland areas there is less risk of damage by *Bactrocera oleae* than in the coastal areas. But in the coastal areas there are a more favourable climatic conditions, a higher quantity of rainfall, and a milder climate in summer and in winter;
- The low use of the chemical control favours surely the attacks of *Bactrocera oleae* in the coastal areas. The best olive orchards have been observed in the zone of Aleppo and Idleb that are the zones with the greatest vocation.
- In the future technical staff need to be trained about the monitoring and processing data that are necessary to review the economic thresholds in the different olive areas.
- The prospects of the agriculture according to the method of the integrated agriculture are positive, while for organic one it is necessary to underline the problems especially in those areas such as Lattakia and Tartous, where the susceptibility to the attacks of *Bactrocera oleae* is high. In the organic field, the use of the traps for massive capture has given encouraging results, but in the future it is advisable to use them in olive fields of at least 3-4 hectares for a better control of the infestation;
- It is advisable to reduce the alternating production, with improvement of irrigation, fertilization and pruning;
- It is necessary to develop the irrigation practises, also with public incentives. Water has to be supplied from private wells and from channels of the collective net that transport water from natural or artificial lakes;
- The annual pruning could be done with soft operations that favour the airing in the inside of the canopy against some diseases and eliminate unhealthy parts;
- It is advisable to give more attention to harvesting. Harvesting from the ground is inadvisable surely, even more dangerous if the olives from the ground are mixed to those from the tree, as in some visits technicians have noticed;
- The storage in sacks of jute or nylon for some days before the transport in mill, must be avoided because the oil quality is damaged. The farmers have justified the excessively long period, because they harvest a low quantity daily on the farm. The low daily yield of harvesting depends on the manual character of worker (only aid of batons). Therefore, the olives remain at farm and not always in a fit location. The use of the plastic aired boxes is still a rarity, but they favour the good air movement, reduce the moisture, avoid crushing and favour easy transport by workers.

At the end of the two-year program of the monitoring and the technical advice in olive growing, the Syrian technicians have achieved a good level of knowledge and they are ready to manage it autonomously each for his own role and in relation to the implemented model. The same Syrian technicians in collaboration with the Italian experts can train the extension workers of the Department of the Agriculture opportunely applying and developing the methodologies implemented by the actual project.

In planning for the future, it is very important, however, to consolidate a valid coordination of the service of technical assistance. For this, a national leader had to coordinate the local technicians. Now, the monitoring data management and data processing (for example the curves of flight of the key insects) do not remain on a data-base, but they are finally exported to the farmers, with the filter of the local technicians has been done with high frequency during the project implementation.



Photo 13: Field day in project demo plot

The draft and the distribution of the weekly bulletin for homogeneous olive areas are necessary to reach the objectives of the service of technical assistance.

The recommendations concern as following:

- To improve the collaboration of the holders of the demo fields. Particularly, they have to effect the suggestions that are advised by the Syrian technicians, in the short term;
- To develop the computer tools that shall allow increasing significantly the dispersion of news and suggestions;
- To increase the involvement and the responsibility of the technicians of the GCSAR;
- To increase the number and area of demo fields to be more representative of the several olive areas;
- To try a to find a television channel that wishes to broadcast a technical programme about agriculture.
- To awaken farmers to the importance of the quality of olives, without this, it is impossible to get oils of good quality. Farmers can get quality in a short time, following the service of technical assistance of GCSAR.

It is right, at the end of the international cooperation experience in Syria, to confirm some reflections and recommendations that have already emerged in a meeting in the GCSAR of Idleb, by Dr. Jamal, Dr. Anwar Al Ibrahim, Eng. Malek Abdine, Dr. Alberto Dragotta, Prof. Francesco Famiani, Dr. Gianluca Montel, Dr. Fabrizio Contento and Dr. Gianluigi Cardone on the future plan for the development of the Project of Technical Assistance and for the improvement of the quality of the olive growing in Syria.

The future of the Syrian olive growing is passing through a continuous and rapid development of the supply of oil, because there is an increase of the surface area covered by olives. In the next years, a lot of olives and oil will arrive on the market and, therefore, the supply will exceed the national demand.

If the national supply exceeds the local demand, a collapse in the market of olive oil in Syria could occur, therefore, it will be necessary to conquer foreign markets to increase the demand for Syrian oil.

But foreign markets demand quality that has to respect rules and norms through:

- A quality system (HACCP, ISO 9000,...)
- A protocol of production;
- A controlled and certified chain;
- An international certification body;
- A product tracing system.

The success of the Quality Plan is possible only if there are strong narrow and advantageous bonds between all the actors of the chain: In the first phase of the plan, it is necessary to select farmers that assure a great professional ability and availability in the system management; in fact, they have to undersign a protocol of quality production with the millers and the dealers.

Possible financial supports would accelerate the start of the activities so that the subjects of the quality chain realize (for example the purchase of means and structures: nets for the harvesting, aired plastic boxes, harvesting machines, pruning machines, etc).



Photo 14: Plastic aerated boxes are already a reality in Syria

It is essential finally to achieve:

- Suitable financial public support for sales promotion, because it is necessary to get an equilibrium point of the supply with demand for a better final market price, that determines a positive relapse on the whole chain;
- The support of technical assistance and of scientific research also by the involvement of the institutes as the GCSAR. This Institute is already a point of reference for the olive and oil sector, after the experience in this Program. But also it is important to take in to consideration the involvement of all the experienced professionals present in public and private institutions.

## References

Yakti A.S., Bakri R., Alnajjar A., Aljaafar A., *Seasonal abundance of the olive fruit fly *Bactrocera oleae* Gmel. and its parasitoids in northern Syria* - 2001

Aljafar A.M., Bakri A.S., Yakti R., *Impact of parasitoids of the phyllophagous and antophagus generation of *Prays oleae* (Olive moth) larvae, in northern Syria* - 2001