



**Giovedì 1 febbraio**

CONVEGNO

**I CAMBIAMENTI CLIMATICI  
E LA DIFESA DEL VIGNETO**

*FIERAGRICOLA, AREA CONVEGNI ENOVITIS*

*PAD. 4 (Macchine e attrezzature per la viticoltura)*

*ore 11:00*

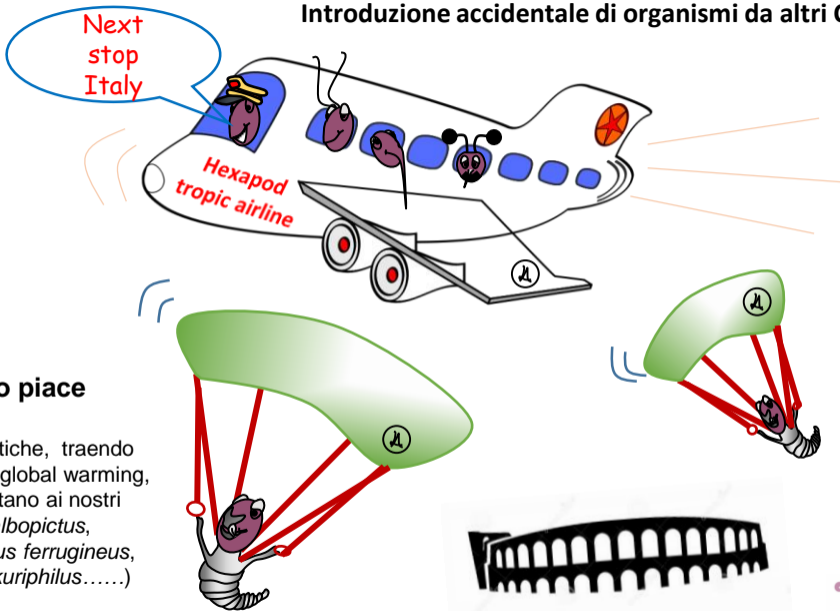
Il cambiamento climatico, con la variazione delle precipitazioni e della temperatura e gli eventi estremi più frequenti, potrà influenzare direttamente ed indirettamente diversi aspetti della viticoltura. Non tutti gli effetti saranno necessariamente negativi. Quello che è certo è che il viticoltore dovrà adattarsi ad un maggior grado di incertezza e maggior flessibilità nella gestione della protezione integrata della vite.

*Andrea Lucchi*

DISAAA-a Università di Pisa

*Nuove sfide nella difesa del  
vigneto dagli insetti dannosi*

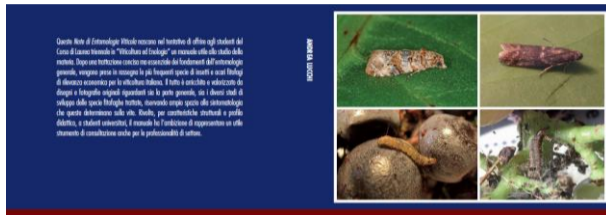
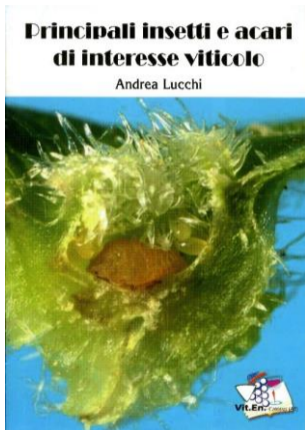
## Introduzione accidentale di organismi da altri Continenti



### A qualcuno piace caldo

Le specie esotiche, traendo vantaggio dal global warming, meglio si adattano ai nostri climi (*Aedes albopictus*, *Rhynchophorus ferrugineus*, *Dryocosmus kuriphilus*.....)

Ma il riscaldamento globale può favorire anche specie «nostrane» influenzandone il grado di dannosità



Andrea Lucchi si è laureato in Scienze Agrarie a Pisa nel 1984 e ha svolto un dottorato di ricerca in lotta biologica e integrata a Perugia dal 1988 al 1991. Professore Associato presso il Dipartimento di Scienze Agrarie, Alimentari ed Agroambientali dell'Università di Pisa, è docente di Entomologia viticola e di Entomologia agraria. È autore di 211 pubblicazioni su riviste internazionali e nazionali. Da alcuni anni collabora attivamente col Dipartimento di Agronomia degli Stati Uniti (USDA-APHIS), con SAG Chile e con IAGROPAR Israele, per la gestione di nuove problematiche entomologiche e agrarie. Dal 2013 è vicepresidente dell'Organizzazione Internazionale di Lotta Biologica e Integrata (IOBC/EPIC) che ha sede a Parigi.

€ 25,00



Note di Entomologia Viticola

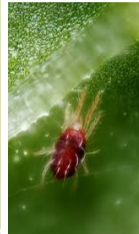
ANDREA LUCCHI  
**Note di  
Entomologia Viticola**

TERZA EDIZIONE

PISA  
S. L. L. S. S. S.

In vigneto sono una cinquantina i fitofagi potenzialmente dannosi

# Solo alcuni preoccupano costantemente i viticoltori



## Tigroietta della vite (*Lobesia botrana*)



Agricultural and Forest Entomology

Agricultural and Forest Entomology (2015), 56, 169–176

DOI: 10.1111/afe.12053

### Global warming affects phenology and voltinism of *Lobesia botrana* in Spain

Daniel Martín-Velazco, Juan J. Ferrero-García and Luis M. Torree-Elva

Servicio de Sanidad Vegetal, D.G. de Epifitocenosis Agrarias y Cultivos Almacenados, Consejo de Agrupación y Desarrollo Rural, Junta de Extremadura, Avenida de Portugal s/n, 06000 Mérida, Badajoz, Spain

- Abstract**
1. Climate change is promoting alterations of a very diverse nature in the life cycle of an array of insect species, including changes in phenology and voltinism. In Spain, there is observational evidence that the moth *Lobesia botrana* Don. & Schiff. (Lep.: Tortricidae), a key vine pest that is usually introduced in Mediterranean latitudes, tends to advance spring emergence, displaying a partial fourth additional flight, a fact that is potentially attributable to global warming.
  2. To verify this hypothesis, local temperatures were correlated with *L. botrana* phenology in six vine-growing areas of southwestern Spain during the last two decades (1984–2006) by exploiting the database of flight curves obtained with sexual pheromone traps. The dates of second and third flight peaks of the moth were calculated for each area and year and then correlated with both time (years) and local temperatures.
  3. The results obtained demonstrated a noteworthy trend towards local warming (as a result of global warming) in the last two decades, with mean increases in annual and spring temperatures of 0.9 and 3.0°C, respectively. Therefore, *L. botrana* phenology has significantly advanced by more than 12 days. Moreover, the phenological advance contributed to increased moth voltinism in 2006 by promoting a complete fourth additional flight, a fact that has never been reported previously to our knowledge in the Iberian Peninsula.
  4. The potential impact of an earlier phenology and increased voltinism in *L. botrana* is discussed from an agro-ecological perspective.

## Cocciniglia farinosa della vite (*Planococcus ficus*)



Journal of Applied Ecology 2006, 43, 534–536

doi: 10.1111/j.1365-2656.2007.01336.x

### Prospective evaluation of the biological control of vine mealybug: refuge effects and climate

Andrew Paul Gutierrez<sup>1,2\*</sup>, Kent M. Daane<sup>1</sup>, Luigi Ponti<sup>3</sup>, Vaughn M. Walton<sup>4</sup> and C. Ken Ellis<sup>5</sup>

<sup>1</sup>Department of Environmental Science Policy and Management, College of Natural Resources, University of California, Berkeley, CA 94720–3174, USA, <sup>2</sup>Center for the Analysis of Sustainable Agricultural Systems (CASAS), Huntington, CA 94707, USA, and <sup>3</sup>Department of Horticultural Sciences, Oregon State University Corvallis, OR 97331-7304, USA

#### Summary

1. Vine mealybug *Planococcus ficus* is an invasive pest of vineyards in many areas of the world. In California, USA, it infests all plant subunits and has a spatial refuge from natural enemies under the bark and on roots. A temporal refuge is created when ants tending the mealybug reduce the efficacy of natural enemies.
2. Biological control of vine mealybug is only partially successful and varies among California grape-growing regions. To improve control and help determine appropriate natural enemies for importation, the effects of weather on mealybug population by two parasitoids, *Diaparsus gaudierensis* and *Leptanotus albicornis*, and a coccinellid predator, *Cryptolaemus montrouzieri*, were examined across the ecological regions of California.
3. Weather-driven, physiologically based age- and sex-structured demographic models of the mealybug and its natural enemies were parameterized using laboratory data and field observations. Temperatures were used to define the thermal limits and development rates of each species, and resource supply-dependent rates were used to scale daily per capita growth, mortality and survivorship rates from maximal values at optimal conditions.
4. The population dynamics of the mealybug and its natural enemies were simulated at 100 locations in California over a 10-year period using observed weather. The simulation data were mapped using a geographical information system (GIS) and analysed using linear multiple regression and marginal analysis.
5. The model predictions indicated that: (i) the parasitoid *D. gaudierensis* has a larger impact on vine mealybug than either *L. albicornis* or *C. montrouzieri*; (ii) mealybug densities will be lowest in the hot desert regions of southern California and highest in the cooler areas of northern California; (iii) mealybug density increases with season length and the size of the combined spatial-temporal refuge; (iv) biological control of mealybug could be achieved by reducing the size of the spatial-temporal refuge.
6. Synthesis and applications. Models, no matter how detailed, will always be incomplete; despite this, the complexity of tri-trophic systems can be modelled and the effects of biotic factors and of weather separated. The predictions of one model coincided well with field observations on vine

Due  
insetti che  
«amano»  
il caldo

## DIRECTIVES

## DIRECTIVE 2009/128/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 21 October 2009

establishing a framework for Community action to achieve the sustainable use of pesticides

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Economic and Social Committee (1),

Having regard to the opinion of the Committee of the Regions (2),

Acting in accordance with the procedure laid down in Article 251 of the Treaty (3),

other related Community legislation, in particular Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (4), Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (5), Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (6), Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin (7) and Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 on the placing of plant protection products on the market (8). These measures should also not prejudice voluntary measures in the context of Regulations for Structural Funds or of Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) (9).

In Europa la **Direttiva 2009/128/CE** ha istituito un quadro per l'azione comunitaria ai fini dell'**utilizzo sostenibile dei prodotti fitosanitari**, sancendo l'obbligatorietà dell'adozione dell'IPM per gli Stati membri. In Italia, questa Direttiva è stata recepita con il Decreto Legislativo N. 150 del 2012 e infine **attuata mediante il Piano di Azione Nazionale (PAN)** per l'uso sostenibile dei prodotti fitosanitari (Decreto Interministeriale 22 gennaio 2014). In tal modo si è inteso “stabilire gli obbiettivi, le misure, i tempi e gli indicatori per la riduzione dei rischi e degli impatti derivanti dall'utilizzo dei prodotti fitosanitari”.

**Il PAN promuove la ricerca di alternative all'uso dei prodotti fitosanitari** e fornisce indicazioni per ridurre l'impatto di questi prodotti nelle aree agricole ed extra agricole.

Per le diverse filiere produttive, l'adozione dell'IPM nel controllo dei principali fitofagi dipende dall'esistenza di strumenti e mezzi alternativi agli insetticidi (**promotori di IPM**), che siano efficaci e, allo stesso tempo, economicamente accettabili.

Per la gestione di questi due fitofagi esistono oggi mezzi e metodi efficaci, alternativi agli insetticidi. Efficacia maggiore se applicati su aree vaste, a livello di comprensorio. **Gli insetti non conoscono CONFINI!!!**

## Areawide Pest Management

Theory and Implementation

Edited by  
Opender Koul  
Gerrit W. Cuperus  
and Norman Elliott



Dagli  
insetticidi di  
sintesi ai  
**Feromoni**



Dagli  
insetticidi di  
sintesi agli  
**Agenti di  
Controllo  
Biologico**



Bolgheri (LI): un'esperienza condivisa



Clima mite

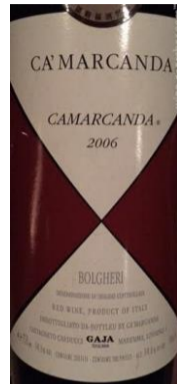
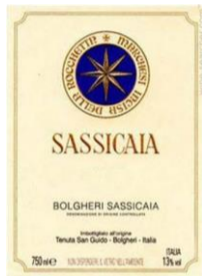
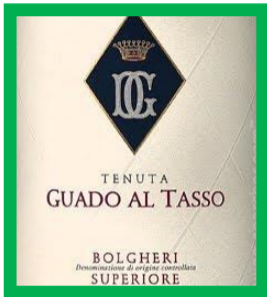
Precipitazioni: 400-800 mm/annui

Suoli: medio impasto e sabbiosi

Tra le aeree più prestigiose per la produzione di vini di qualità

(<http://www.wine-searcher.com/regions-bolgheri>)

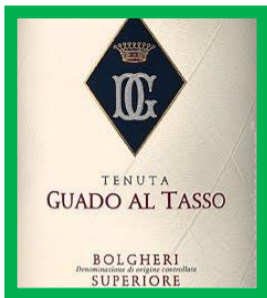
## CONDIZIONI AMBIENTALI



Principali problemi entomologici: Lobesia e Planococco

Da sempre: 2-3 insetticidi con IGRs o fosfororganici contro Lobesia e 1-2 contro il Planococco con insetticidi sistemici o con fosfororganici.

**Elevato valore dei vini, necessità di uve sane, timore nell'abbandonare la lotta insetticida**



GUADO AL TASSO – ANTINORI (300 ha di vigneti)  
**Forte interesse per possibili strategie non insetticide**

**Coinvolgimento dell'Università per un progetto condiviso nel controllo di Lobesia e Planococco**

**Primi passi**  
**Formazione e coinvolgimento**

- Incontri preliminari con tecnici aziendali e consulenti
- Conoscenza delle problematiche (vigneti maggiormente infestati, valutazione critica dei dati storici di monitoraggio.....)
- Coinvolgimento di tutti gli «attori» nel progetto con la formazione di un gruppo tecnico coordinato dall'Università
- Formazione (workshops, video, pieghevoli)



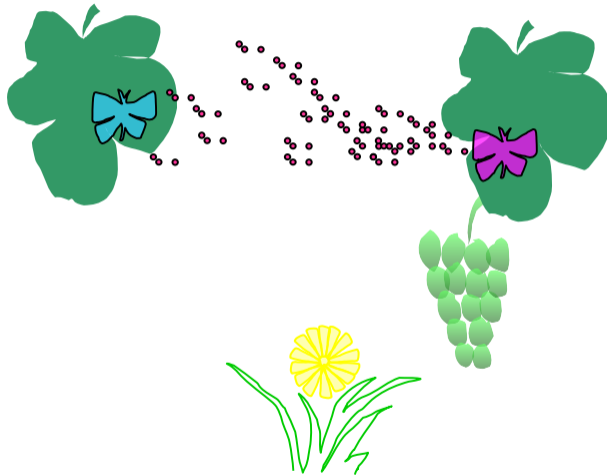
## PROGETTO LOBESIA

Su nostra proposta  
l'azienda applica la CS su  
1/6 dell'intera superficie  
(50 ha) per poter  
confrontare i risultati con la  
strategia insetticida.

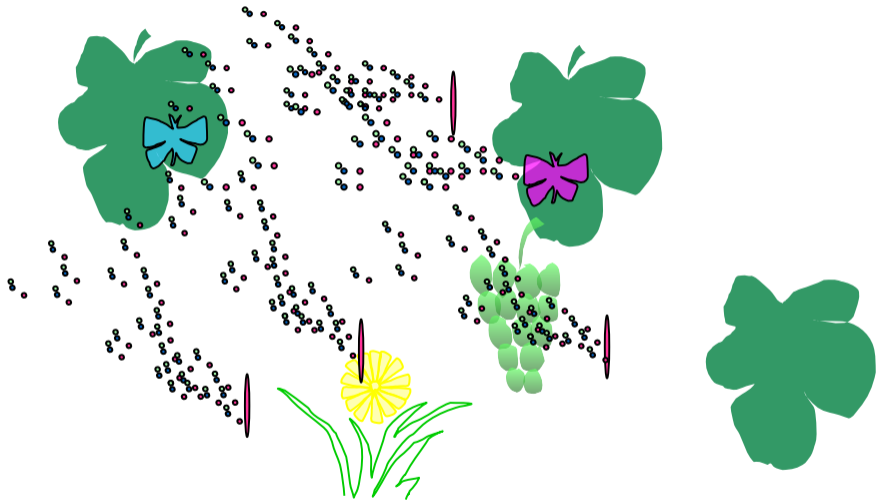
CS con erogatori  
ShinEtsu Isonet L applicati  
a fine marzo (500 per ha).



## IL RICHIAMO SESSUALE NEI LEPIDOTTERI

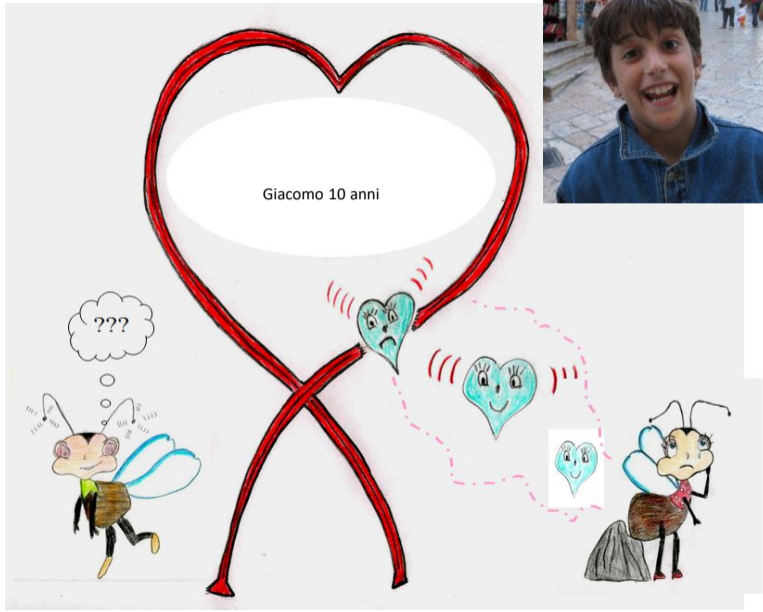


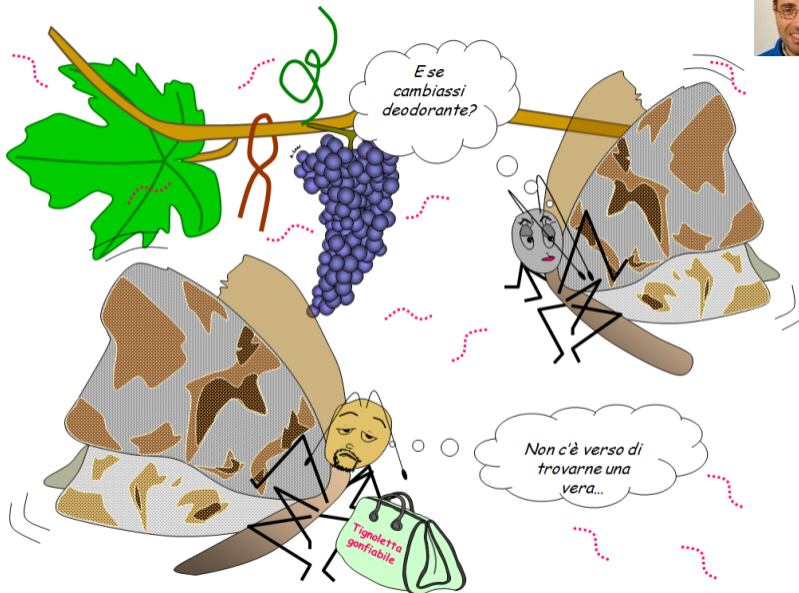
# IL METODO DELLA CONFUSIONE SESSUALE





Giacomo 10 anni





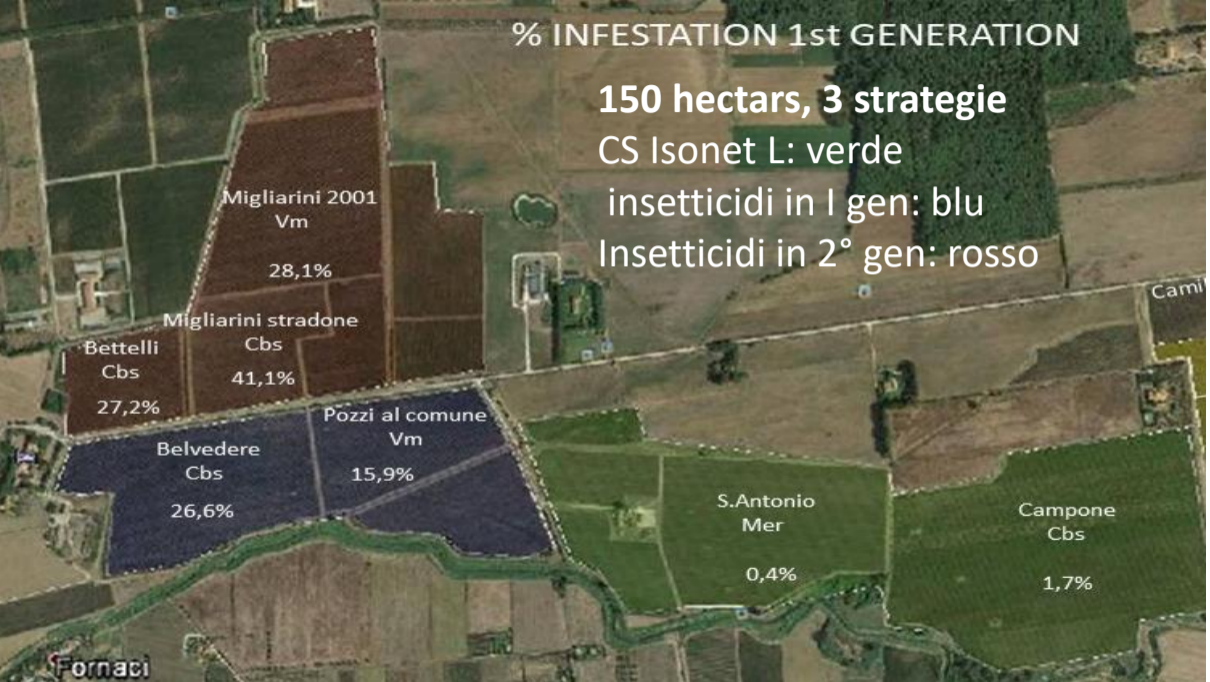
## % INFESTATION 1st GENERATION

**150 hectares, 3 strategie**

CS Isonet L: verde

insetticidi in I gen: blu

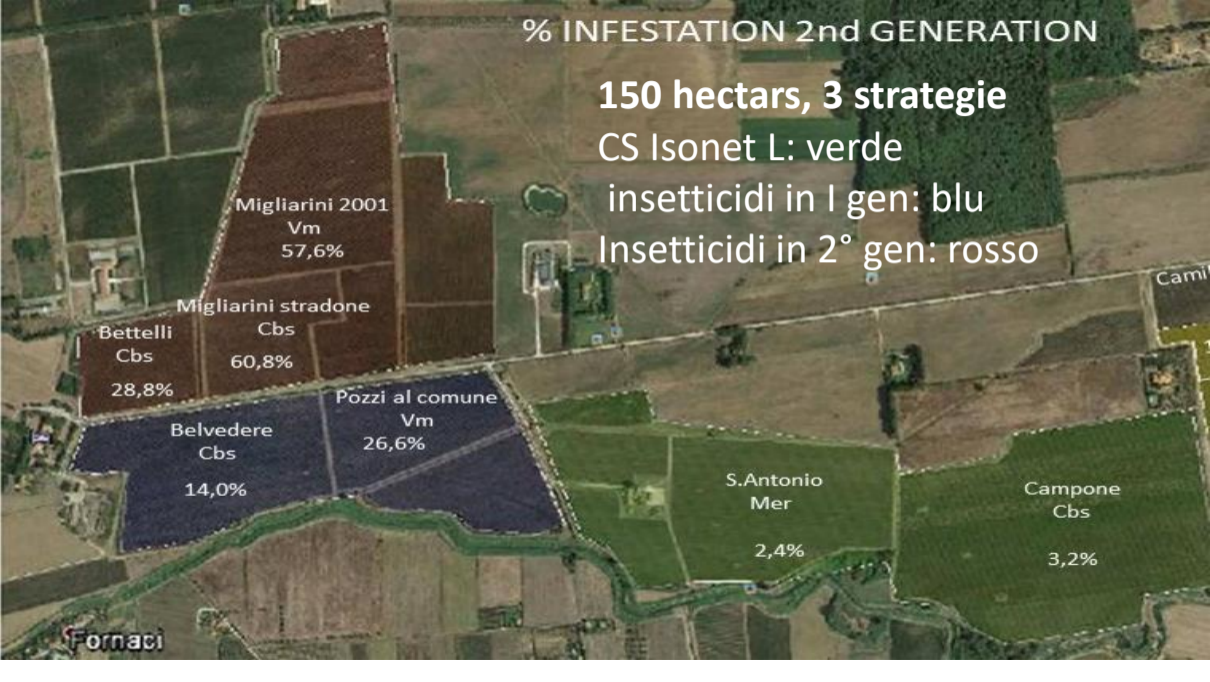
Insetticidi in 2° gen: rosso





# % INFESTATION 2nd GENERATION

**150 hectars, 3 strategie**  
CS Isonet L: verde  
insetticidi in I gen: blu  
Insetticidi in 2° gen: rosso



Fornaci

# % INFESTATION 3rd GENERATION

**Clorantraniliprololo**  
prima settimana fi  
Agosto

Migliarini 2001  
Vm  
55,20%

Migliarini stradone  
Cbs  
56,8%

Bettelli  
Cbs

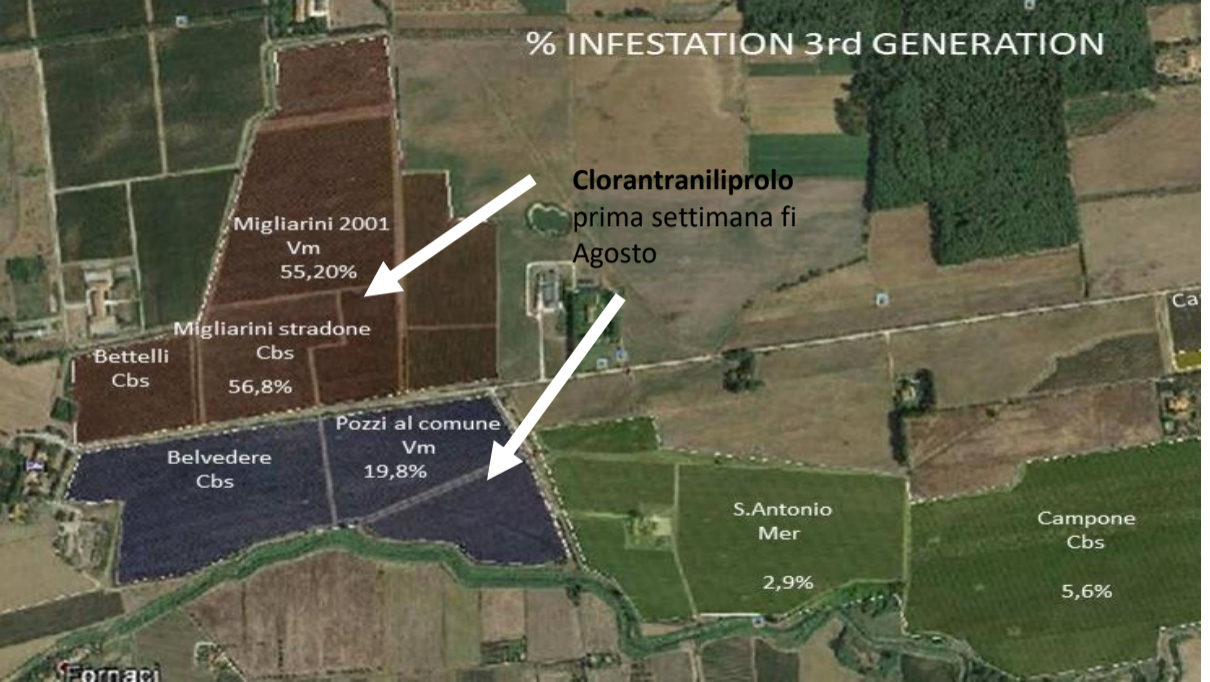
Belvedere  
Cbs

Pozzi al comune  
Vm  
19,8%

S. Antonio  
Mer  
2,9%

Campone  
Cbs  
5,6%

Fornaci



## Cocciniglia farinosa della vite (*Planococcus ficus*)



La cocciniglia farinosa trasmette due virus della vite  
di **R. Credi, F. Terlizzi C. Lanzoni, L. Martini, S. Borsari, E. Pasqualini**

La ricerca ha confermato la capacità di *Planococcus ficus* di veicolare il virus dell'accartocciamento fogliare (GLRaV-3) e del legno riccio (GVA)

**L'Informatore Agrario, 33/2010**

## PROGETTO PLANOCOCCO

Rilascio dell'Encirtide *Anagyrus* sp. near *pseudococci*, in Maggio (1,000 individui per ha su un totale di **3.5 ha**) e il Coccinellide *Cryptolaemus montrouzieri* (500 per ha su un totale di **4 ha**) in June and/or July.



A titolo dimostrativo: video posto su YOU TUBE  
(<https://www.youtube.com/watch?v=1La2ZawSBHc>)

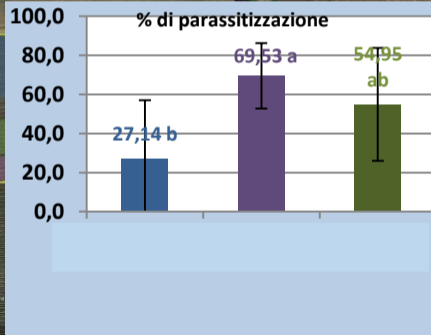
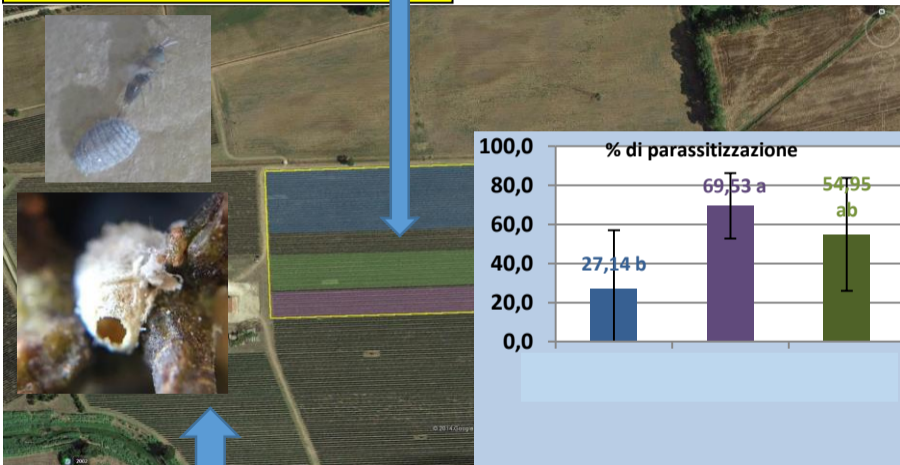
Biological control of *Planococcus ficus*  
with  
*Anagyrus sp. near pseudococci*  
and  
*Cryptolaemus montrouzieri*

(Copyright by Department of Agriculture, Food and Environment (DAFE)  
University of Pisa © All rights reserved © 2017)

Guado al Tasso

Controllo in vendemmia su 600 grappoli

500 adulti di *Anagyrus* sp. near *pseudococci*



1000 adulti di *Anagyrus* sp. near *pseudococci*

**Bolgheri 2016:** CS x Lobesia e BCAs x Planococco, applicati rispettivamente su **600 ha** e **300 ha**, con risultati molto soddisfacenti.

Le strategie adottate avevano contenuto la dannosità dei due insetti nei vigneti interessati. La riduzione della quantità di insetticidi utilizzati per il controllo dei due insetti era percepito come dagli operatori del settore come un importante traguardo.

Nel **2017** altre importanti aziende entrano nel progetto applicando feromoni e BCAs rispettivamente su 1000 e 600 ha.

Nel **2018** parteciperanno al programma le aziende di Guado al Tasso (Antinori), Cà Marcanda (Gaja), Ornellaia (Frescobaldi), Castello di Bolgheri.

Il progetto è stato presentato a 2 incontri dell' EIP-Agri Focus group in Portogallo e in Romania dal titolo «Malattie e Artropodi dannosi in viticoltura» e fatto circolare tra gli Stati Membri come un'esperienza pilota con il titolo «sharing needs and knowledge promotes IPM».

The screenshot shows the EIP-AGRI website interface. At the top left is the EIP-AGRI logo with the tagline 'AGRICULTURE & INNOVATION'. The main header features a green banner with the text 'SHARING KNOWLEDGE - CONNECTING PEOPLE - TACKLING CHALLENGES' over an image of hands holding a small plant. Below this is a navigation menu with items: ABOUT, MY EIP-AGRI, SHARE, MEETING POINT, EVENTS, NEWS, PUBLICATIONS, and FOCUS GROUPS. The page title is 'European Commission > EIP-AGRI > Focus Groups > Diseases and pests in viticulture'. On the left, there is a vertical sidebar with categories: Agroforestry: woody vegetation, Animal husbandry, Benchmarking farm performance, Carbon storage in arable farming, Circular horticulture, Dairy production systems, and Diseases and pests in viticulture (highlighted). The main content area displays the title 'Diseases and pests in viticulture' and the text 'How can we increase resilience of grape vines to pests and diseases and support the productivity of the sector in sustainable ways?'. Below this, it states 'This Focus Group is ongoing.' and 'Tasks:'.

## Diseases and pests in viticulture

How can we increase resilience of grape vines to pests and diseases and support the productivity of the sector in sustainable ways?

This Focus Group is ongoing.

Tasks:

The poster is titled 'FG Wine' and is by Andrea Lucchi from DISAAA at the University of Pisa. It describes a case study in a winery in Tuscany, Italy, dealing with two pests: *Lobeblatta bohemica* and *Planococcus ficus*. The poster is divided into several sections:
 

- The key-pests of grapevine:** Images of *Lobeblatta bohemica* and *Planococcus ficus*.
- Region / Area:** Tuscany - Italy, with a map of Italy highlighting the region.
- GEOGRAPHICAL CONDITIONS:** Climate: Mild climate with medium-high rainfall (400-800 mm per year on average). Terrain/Soil: Mostly sandy soil.
- CASE DESCRIPTION:** In 2014, a well-known and large Winery in Tuscany (Guido al Tasso - Antinori Agrico, 300 hectares in Bolgheri, province of Livorno) asked for help in the control of *Lobeblatta bohemica* and *Planococcus ficus*. Insecticide strategies (3 sprayings per year against *Lobeblatta* with IGRs, 2 per year against *Planococcus* with systemic or neurotoxic insecticides) were not effective and the manager was willing to test alternative strategies.
- MANAGEMENT STRATEGY AS A WHOLE:** For *Lobeblatta* control the farm used to apply at least three insecticides with IGRs. For *Planococcus* the strategy included 2 insecticide sprayings with Spinetoram and/or with Chlorpyrifos. In both cases efficacy at harvest was limited and not satisfactory. The farm contracted Pisa University in order to have its support.
- SPECIFIC PEST / DISEASE MANAGEMENT STRATEGY:** The proposal for 2014 was to apply mating disruption (MD) against *Lobeblatta* and biocontrol agents (BCAs) against *Planococcus*, starting from one sixth (50 hectares) of the whole farm surface (300 hectares), in order to be able to compare obtained results with the conventional strategy. In that year results were really positive: no spray against *Lobeblatta* were needed in MD areas with very good results at harvest, whereas 2 interventions in the conventional areas were implemented with limited efficacy. Good efficacy was obtained in the control of *Planococcus* too. We released the parasitoid wasp *Anagrus* sp. near *pseudococci* in May (1,000 individuals per hectare) and the predator ladybird *Cryptoblemus morosus* (about 500 individuals a hectare) in June-July. In 2015 and 2016 this strategy was applied on all the available farm surface (300 hectares) with good results, so that other local small and big wineries joined the project. In 2016 MD against *Lobeblatta* and BCAs against *Planococcus* were applied on 600 hectares in that area, with satisfactory results in terms of efficacy. The substantial decrease in the amount of insecticides due to MD and BCAs use was perceived as the first major step forward that improved the public perception that wine was produced with high environmental safety standards. The action plan drastically reduced insect populations, so that other farms joined the project in 2017 and the area managed in IPM further risen (BCAs and MD on about 1,200 ha).
- KEYS OF SUCCESS / FAILURE:** Vineyards were relatively young, well managed, plain and large. Growers and technicians were trained and open to new experiences. The University's support was crucial in providing assistance and training (see video at: <https://www.youtube.com/watch?v=8L2Zaw5Bhc>).
- WHAT WAS THE ECONOMIC IMPACT?** Less input of insecticides, cost of new control products affordable, training of farmers, involvement of new wineries, adoption of sustainable strategies with an Area-wide approach.
- WHY IS THIS NOT A COMMON SITUATION?** Because high-quality Villanovesi (also large and famous Wineries) do not trust to use new control strategies without the support of Universities or other Research Centers involved in applied entomology.

 At the bottom, there are four small images: *Lobeblatta bohemica*, *Cryptoblemus morosus*, *Anagrus* sp. near *pseudococci*, and the parasitoid wasp. A footer note states: 'This poster was presented at the first meeting of the EIP-AGRI Focus Group "Diseases and pests in viticulture" - Oct. 2016'.



## RAGIONI DEL SUCCESSO

Condivisione del problema: l'efficacia non soddisfacente degli insetticidi unita ad una accresciuta sensibilità per strategie sostenibili ha spinto i produttori a chiedere un aiuto all'Università;

Esistenza di sistemi di controllo efficaci alternativi agli insetticidi: feromoni e BCAs

Ottime condizioni agronomiche: i vigneti erano relativamente giovani, piani e condotti con raziocinio. Gli imprenditori e i tecnici aziendali erano preparati e aperti all'innovazione.

# Take home message

- Risultati positivi nel controllo dei tre insetti bersaglio;
- Riduzione considerevole della quantità di insetticidi di sintesi utilizzati;
- Costituzione di un allevamento di insetti utili in vigneto con probabili effetti positivi negli anni a seguire anche per le altre aziende del comprensorio;
- Contributo alla cooperazione e all'aggregazione tra le aziende, con condivisione:
  - di problematiche comuni
  - delle strategie adottate
  - dei risultati raggiunti
- Esperienza pilota apprezzata a livello comunitario

Grazie per la cortese attenzione

