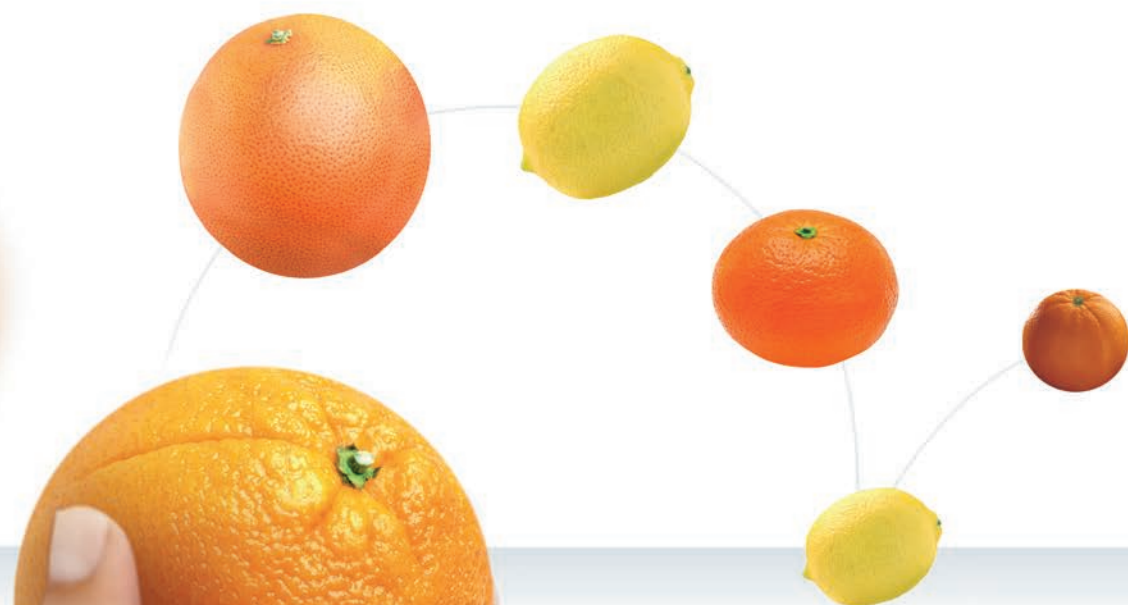




Science For A Better Life

Improving Competitiveness and Reliability for Consumers



food chain partnership



Our sustainability inputs

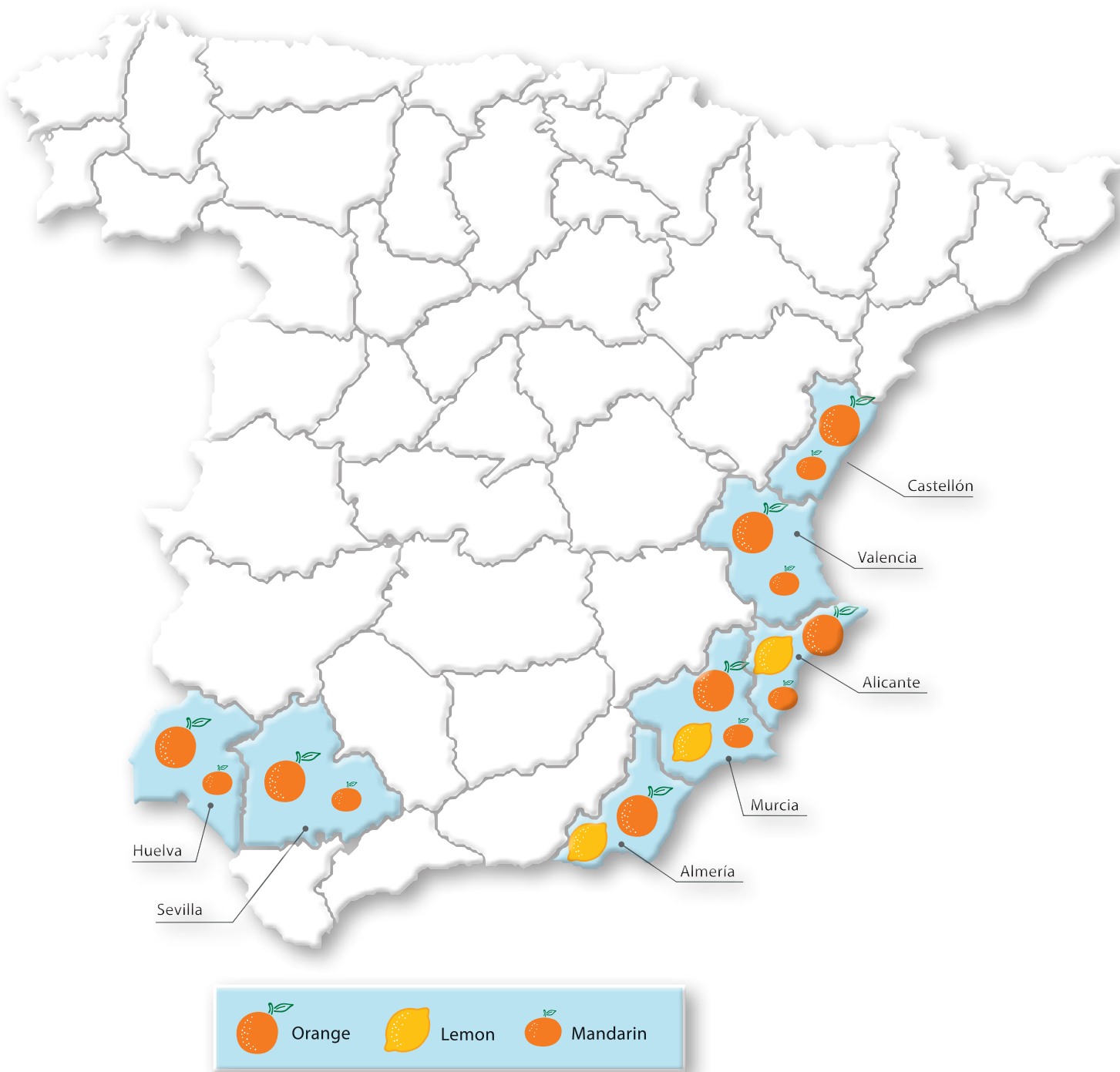


BAYDIVERSITY

Bayer Phytobac



Food Chain Partnership by Region / Crop



What we aimed to achieve

Our main objective was to contribute to the production of high quality fruits that meets consumer demand in terms of food safety while respecting sustainability principles. The achievement of such objectives were based on a close collaboration with our partners who are committed and engaged towards sustainable agriculture.



Pheromone trap to attract males of California Red Scale



Male of the aphelinid *Cales noacki*, parasitoid of the citrus whitefly *Aleurothrixus floccosus*

Photo: Ferran García Mari.
Mediterranean Agroforestry
Institute of Politechnical
University of Valencia



Adult of the lacewing *Chrysopa* spp., polyphagous predators of aphids, scale insects, leaf miners, mites, etc.

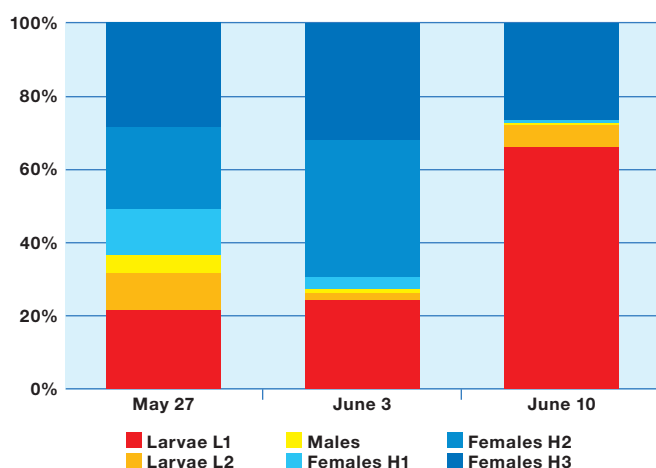
Photo: José María Soler Feliu,
Bayer CropScience

The integrated solution

The starting point was a sampling of different parts of trees in each of the farms participating in the project, to identify the initial status with regard to pests, statistically quantifying presence/absence levels.

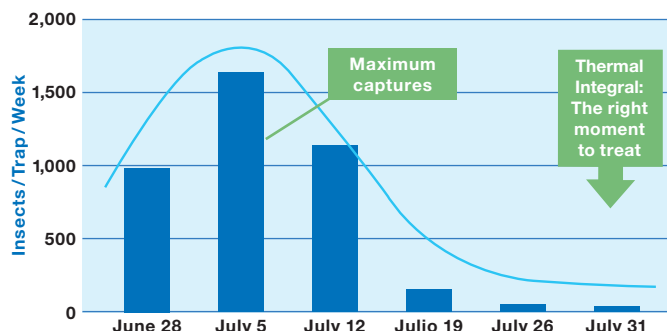
The biological cycle of the first generation of California Red Scale and White Scale was monitored, to establish the major percentage of sensitive forms and to implement the treatment at the most optimal time. A similar task was given for the most prevalent red spider mite (*Tetranychus urticae*) in mandarin trees, the citrus blossom moth (*Prays citri*) in lemon trees, and *Pezothrips kellyanus* in mandarin, orange, and lemon trees. It has to be highlighted that the applied strategies were very efficient, especially for *Pezothrips kellyanus*, and contributed in avoiding fruit damage.

Biological cycle of California Red Scale



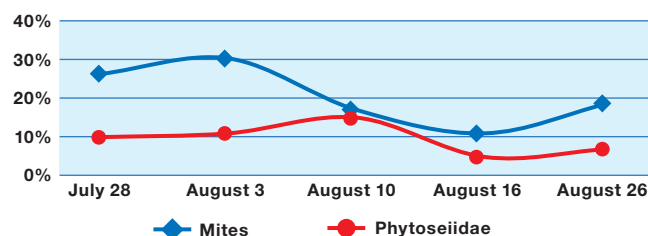
The second generation of California Red Scale and White Scale was also monitored using sticky pheromone traps to lure the males of the species. This allowed us to know the population status of both scales. In addition, the calculation of the site's thermal integration gave us the indication of the best treatment timing.

Male captures of California Red Scale cromatic traps with pheromones



The red spider mite, *Tetranychus urticae*, was monitored together with phytoseiidae, their natural enemies. Acaricide solutions, compatible with the beneficials used, were used when the pest treshhold was exceeded.

% of leaves with red spider mite (*Tetranychus urticae*)



Adult of the coccinellid *Rodolia cardinalis*, predator of the cottony cushion scale *Icerya purchasi*

Photo: José María Soler Feliu, Bayer CropScience



Female of the encyrtid *Metaphycus helvolus*, parasitoid of soft scale insects

Photo: Alejandro Tena Barreda (I.V.I.A.)

These Food Chain Projects also included other activities such as application technology. It is important to say that improving spraying quality is a key sustainability parameter. In this regard, Bayer cropScience carried out different activities such as regulation of sprayers, calibration (taking into consideration pressure, speed, caudal of nozzles, etc.). All of these actions were implemented according to the pests in focus and the tree dimensions.

Another important parameter used was the identification and quantification of the beneficials of these pests, which help us identify the following:

- The quantity of beneficials
- The level at which they can be controlled without treatment

The big population of the parasitoid of citrus whitefly (*Cales noacki*), the predator of the cottony cushion scale (*Rodolia cardinalis*) and the parasitoid of ceroplastes (*Metaphycus helvolus*) were managed and controlled adequately while avoiding specific treatments.

Moreover, all the Food Chain partners used anti-drift nozzles in their farms. Not only, these are required by the European Directive of Sustainable Use, but highly important in improving the efficacy of the treatments.

Spraying machine training workshop



Kit for calibration of nozzle pressure and flow



Use of standard nozzles



Use of anti-drift nozzles



What we achieved

These Food Chain initiatives are an example of the commitment and engagement of the partners towards contributing to a sustainable agriculture. Bayer CropScience implemented a variety of tools and measures such as pest monitoring, machinery regulation, use of anti-drift nozzles, beneficials' management, coaching courses, etc.. These activities were highly appreciated and contributed to tangible results:

- Pest control was better than on conventional farms
- There was an increase of beneficials, making the use of specific pest treatments unnecessary
- Quality fruit at competitive prices, complying with the European retailers requirements with regard to safe and consumer-healthy produce
- Good added value for producers, as farms were better driven and a sustainable balance was reached for future good management



food chain partnership





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Consumers are becoming increasingly conscious of the need for healthy nutrition. Food Chain Partnerships help to supply consumers with high-quality fresh produce, which forms the basis of a healthy diet. But such partnerships can only succeed if they involve every player in the food chain – from the farmer and processor to the exporter or importer and retailer. Bayer CropScience has the global experience and cutting-edge expertise to create a successful partnership at every level.

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