



Fruit flies and its quarantine relevance in the citriculture of Northwestern Argentina. Eleven years of research 1996-2007

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Preface

The Estación Experimental Agroindustrial Obispo Colombes (EAAOC) from Tucumán, Argentina is a public institution created in 1909 as an initiative of the private sector to solve the major problems in agriculture and its derived industry in the province of Tucumán. It is one of the oldest agriculture research centers in the country and also in Latin America. In its almost 100 years of existence, the EAAOC has made a substantial contribution to the development of agriculture and agro-industry in northwestern Argentina (NWA). In its early days, the main activities were oriented towards strengthening the sugar industry by ways of different strategies. Later, different projects were supported in an effort to diversify crop production. These included research and development of various fruit and vegetable crops (citrus, avocado, potato, strawberry, etc.) as well as grain and oilseed crops (bean, maize, soybean, etc.). These activities brought about new approaches and requirements, such as crop breeding, management, and protection.

The intensification of international trade of commodities has increased the risk of the introduction of new pests. Each country's official plant health organizations adopt measures to protect their productions

and regions, and impose requirements that often involve complex investigations, costly infrastructure, and continuous training.

In the early 1990s, the EAAOC accepted the challenge and started a new research line concerning the development of quarantine systems that would contribute to the opening of new markets to vegetable and fruits produced in the region.

The first projects were oriented towards the export of citrus fruits to Japan and implied the development of quarantine low temperature treatments for Mediterranean fruit fly. This project, funded by the private sector, was carried out at the Sección Zoología Agrícola of the EAAOC and ended successfully in 2003 when Japan accepted the import of citrus fruits from Argentina. At the same time, the EAAOC was recognized by the Ministry of Agriculture, Forestry and Fisheries of Japan as one of the international centers specialized in the development of quarantine systems.

In the last few years, the Sección Zoología Agrícola of the EAAOC conducted different types of research projects aimed at improving domestic and international commerce of fruits and vegetables (citrus,

avocado, strawberry, tomato, pepper, and blueberry). Different strategies were considered, such as quarantine treatments by physical (low temperatures) and chemical (methyl bromide) methods, a risk assessment system approach, the study of resistance mechanisms to various pests, research on host status, etc. All these research activities require an active interaction with different production sectors and organizations, for example the Asociación Fitosanitaria del Noroeste Argentino (AFINOA); the Cámara de Exportadores de Cítricos del Noreste Argentino (CECNEA), and the Cámara Argentina de Productores de Arándanos y Berries (CAPAB). Also with public and private plant health organizations, such as Fundación Barrera Patagónica (FUNBAPA), Instituto de Sanidad y Calidad Mendoza (ISCAMEN) and a strong interaction with the Argentinean federal plant health organization (SENASA).

All these laborious activities meant hard work and commitment of the EEAOC and its researchers, which materialized in training and education of human resources in important national and international research centers. Several graduate theses were produced as a result of the research conducted in these projects. The level of expertise achieved by the researchers, led to their appointment to international expert panels dealing with quarantine issues.

The present publication summarizes eleven years of research conducted at the Sección Zoología Agrícola of the EEAOC regarding quarantine issues of citrus production in NWA. Research data is organized in ten chapters, presented by the chronological order in which they were obtained.

Chapters I and II present an overview of citriculture in Argentina and a more detailed description of this activity in NWA, emphasizing on lemon production. The description of the different fruit fly species of economic importance present in the region and their relationship with the

predominant crops in Tucumán are also considered.

Chapters III, IV, and V include research on the development of quarantine treatments by physical (low temperatures) and chemical (methyl bromide) methods for the commercialization of citrus fruits into national and international markets. It also includes a full description of all the necessary steps to achieve a quarantine treatment according to international standards.

Chapters VI and VII show the results obtained during four consecutive years of field survey of Mediterranean fruit fly (*Ceratitis capitata* Wied.) and South American fruit fly (*Anastrepha fraterculus* Wied.) adults. In addition, data from samplings of lemons from the field and packing houses are presented.

The results from studies related to the identification of chemical compounds present in the essential oil of the lemon skin glands are detailed in Chapter VIII. These compounds account for the resistance of lemon fruits to the development of *C. capitata*.

Chapter IX contains the results of research conducted to determine the status of lemon as a host of *C. capitata* and *A. fraterculus*. Infestation tests in laboratory and field conditions were done both in the field and in the laboratory, following international guidelines.

Finally, Chapter X integrates all the results from Chapters VI through IX: the risk of an eventual introduction of *C. capitata* and *A. fraterculus* with the import of lemons from NWA is analyzed, based on international standards, qualitative and quantitative parameters, statistical analyses, and literature references.

Due to the importance of this book, and in an effort to facilitate its reading and reach to as many readers as possible, it is written both in Spanish and English, trying in the latter to respect the style of the authors.