Seasonal fluctuation of Oriental Fruit Moth *Grapholita molesta* (Busck) with sexual pheromone trap in peach orchards in Bento Gonçalves, RS, Brazil

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Abstract: Seasonal fluctuation of *Grapholita molesta* (Busck, 1916) (Lepidoptera: Tortricidae) males was evaluated in two commercial peach orchards cv Chiripá in Bento Gonçalves, RS, during June of 2000 to July of 2002. The insects were evaluated weekly using Delta traps (two/orchard) baited with commercial synthetic sex pheromone (E-8-dodecenyl-acetate + Z-8-dodecenyl-acetate + Z-8-dodecenol). Four peaks were observed during peach production period: last week of August, first of November and December and second of January. Medium temperature seven days before evaluation was positively correlated with catches of *G. molesta* males in the traps. Information about seasonal fluctuation can be used for growers as a tool to guide insecticide treatments for pest control in peach orchards.

Key words: Oriental Fruit Moth, seasonal fluctuation, peach, Integrated Fruit Production.

Introduction

Peaches, which represent one of the most important temperate fruit in the country, are grown on nearly 20.000 ha in Brazil. The production is concentrated in Rio Grande do Sul (RS), São Paulo (SP), Santa Catarina (SC), Paraná (PR) and Minas Gerais (MG) states (Marondin & Sartori, 2000; Sidra, 2002). The main producer state is Rio Grande do Sul (12.000 ha) and the fruits are for the internal market, being 50% for fresh consumption and 50% for the canning industry.

Since 1950, *Grapholita molesta* (Busck, 1916) (= *Cydia m.*) (Lepidoptera: Tortricidae) has been an important peach pest in Brazil (Lepage, 1943). Presently, insect control is based on broad-spectrum insecticide treatments (organophosphates, carbamates and pyrethroids), but growers usually do not monitor pest infestation and do not follow threshold levels, established as 20 adults per pheromone trap per week (Fachinello *et al.*, 2003). As a result of this pest management, many negative effects such as the possibility of residues in fruits, toxic effects for the growers and environmental contamination are acute concerns for growers, technicians and consumers (Botton *et al.*, 2001 and 2002). For these reasons, safer and more rational control methods than conventional chemical insecticide use need to be developed.

The development of a sex pheromone trap for OFM led to increased efforts for monitoring insect population, so that a better timing of spraying could be achieved (Roelofs *et al.*, 1969; Rice *et al.*, 1982). The following report presents two years of seasonal adult fluctuation of *G. molesta* males in Bento Gonçalves, RS, Brazil, located in the major table peach production region. The study also shows a relation between climate and OFM biology offering data for farmers to take decisions on the management of this pest.

Material and Methods

The study was conducted during 2000 and 2001 seasons in two commercial peach orchards (cv. Chiripá). Peach trees, ca.10 years old and 3.5-4 m tall, were planted on a 4 x 6 m (tree x row) spacing. The OFM adult male population was monitored by using Delta traps (baited with commercial *G. molesta* synthetic sex pheromone dispenser with 1 mg of E-8-dodecenyl-acetate (95%) + Z-8-dodecenyl-acetate (5%) + Z-8-dodecenol (1%) (Isca Tecnologias Ltda, Rio Grande do Sul, Brazil). The traps were placed in the orchards in July 2000 and maintained in the field for the whole duration of the monitoring period. At each orchard two traps were placed on 30 m spacing, 1.7 m from the top of the peach orchard canopy. The traps were serviced weekly and the captured males were removed and recorded. The pheromone dispensers were changed at 6-week intervals while the traps were replaced when necessary.

Weekly catches of *G. molesta* males in the traps were correlated with average temperature (°C) and rainfall (mm) recorded during the preceding seven days. Climatic data were recorded daily on a standard hygrothermograph station located nearly 1.500 m far from the orchards. The spray program for pest control was performed according to the farmers' decision.

Results and discussion

Four distinct peaks were recorded in the flight pattern of *G. molesta* each year during the vegetative period (August-January). In both years, no catch was recorded in June, only sporadic catches in July and a major presence in mid August (Figs. 1 and 2).

In the region, Biofix can be set in the first week of August. This parameter indicates the starting of stable presence of the insect, that is the first catch followed by catches in the next sampling. This is the basis for the application of temperature-based forecasting models.

The first generation adults fly in October and early November, the other peaks occur in early December and mid January. The latter was the highest in both years with an increasing overlapping of generations (Figs. 1 and 2).

The level of catches was positively correlated with temperature data of the preceding week, but not with rainfall.

Information gathered in the Bento Gonçalves region has been used to give advice to the growers of area, pointing out the four major periods of the adults' presence. These results make it advisable to carry out monitoring in every orchard or to set up a monitoring net. It is also important to define thresholds for specific situations.

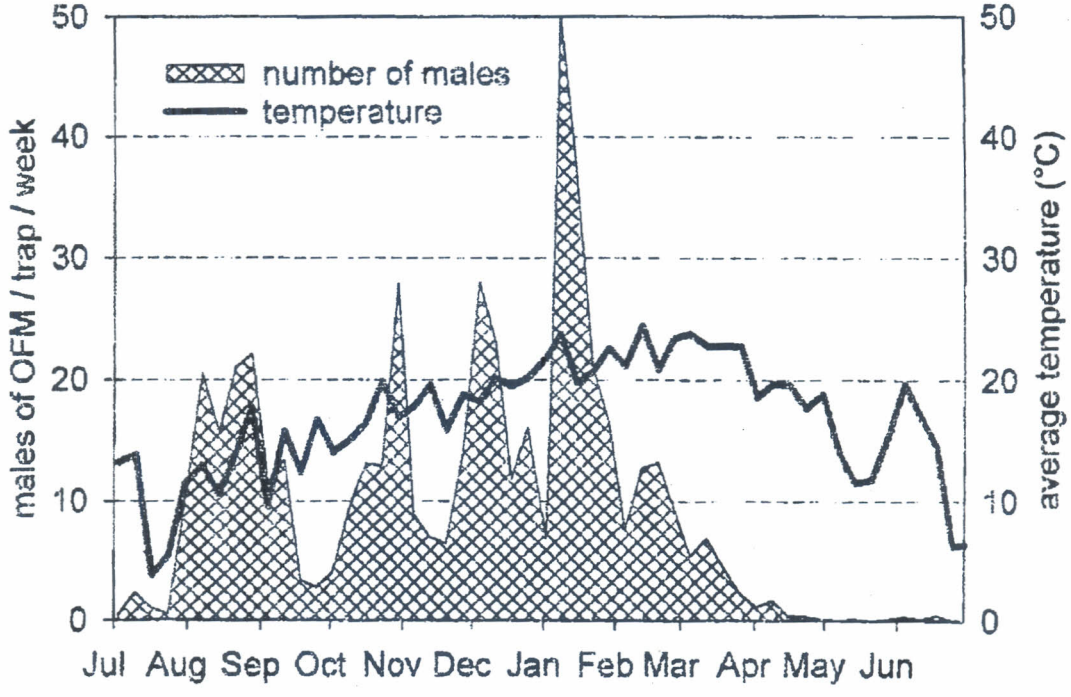

Figure 1. Seasonal fluctuation of oriental fruit moths male caught per pheromone sexual traps in 2000/2001 season.

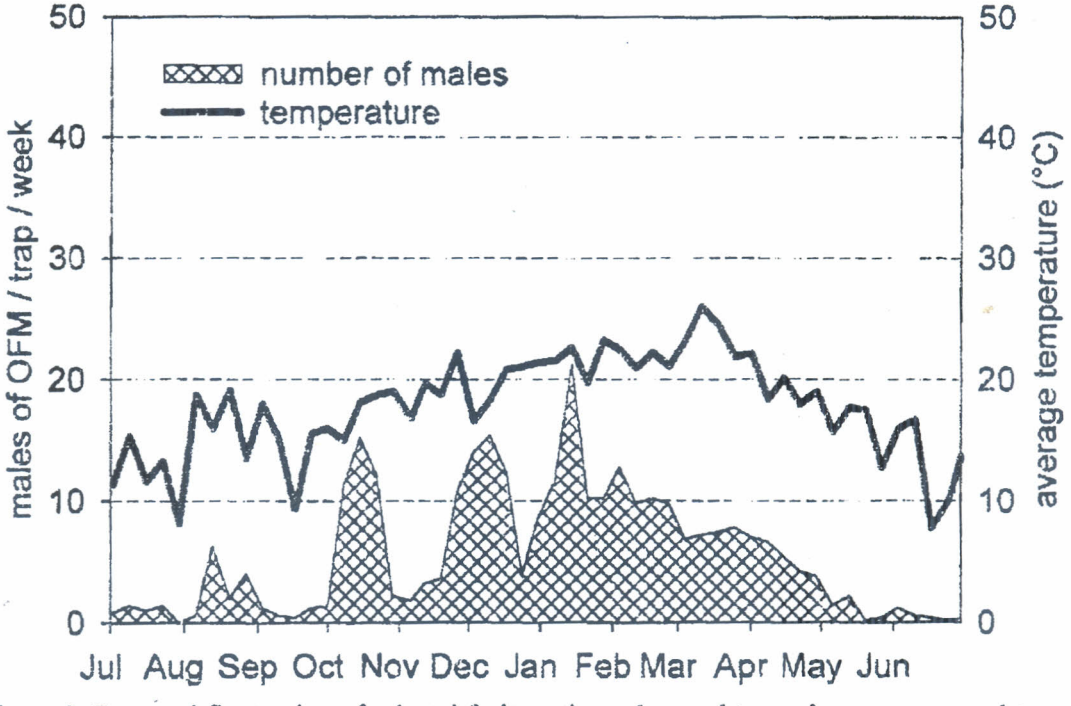

Figure 2. Seasonal fluctuation of oriental fruit moths male caught per pheromone sexual traps in 2001/2002 season.

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