Occurrence of Caterpillar of the Olive Tree, *Palpita forficifera* (*Lepidoptera*: *Pyralidae*) in Olive Groves in the State of Rio Grande do Sul

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Keywords: caterpillar, *Pyralidae*, olive tree pest

Abstract

The caterpillar of olive, *Palpita forficifera*, is a major pest of olive cultivation worldwide. This caterpillar damages the olive culture due to its feeding on leaves, especially young shoots, and may also eat fruits at high infestations. Several olive groves were monitored in the municipalities of Santana do Livramento, Bagé, Candiota, Cachoeira do Sul, Pelotas and Rio Grande, Rio Grande do Sul State, since November 2010, aiming to detect the occurrence period and damages caused to olive crops in the State of Rio Grande do Sul. The damages to shoots affect photosynthesis by reducing the leaf area, and the olive yield on the next year, since it is through the shoots that new fruits will be produced. This is the first record of *P. forficifera* in olive groves in the Rio Grande do Sul, Brazil.

INTRODUCTION

Palpita sp. is a major pest of world olive growing, being reported in the producing regions, such as Italy, Spain, Greece, Portugal, Sweden, Poland, Japan, Asia, Africa, the Americas (Khaghaninia and Pourabad, 2009; Hegazi et al., 2011), Chile (Estay et al., 2009; Sanhueza and Escobar, 2009), Peru (Beingolea and Torres, 1970; Gómez, 1999; Lazo and Pozzuoli, 2004), Uruguay (Villamil and Albin, 2006) and in Brazil a few studies report the occurrence in Minas Gerais (Cordeiro et al., 2012), Santa Catarina (Chiaradia and Da Croce, 2008) with the *P. perssimilis* species, and Rio Grande do Sul *P. unionalis* (Coutinho et al., 2009).

The hosts of the caterpillar of olive trees are mainly the family *Oleaceae* (*Jasminum* sp., *Ligustrum* sp., *Olea europea* and *Phyllirea media*), it feeds on young shoots, but can also attack fruits under high infestations (Hegazi et al., 2011).

MATERIALS AND METHODS

The study was conducted from October 2010 to October 2012, in five olive groves in Rio Grande do Sul State, Brazil (Table 1).

In each municipality an olive grove was chosen and collection of 20 olive shoots was determined by the number of caterpillars in each municipality.

The collected caterpillars were counted and placed in plastic pots and taken to the laboratory of Entomology of Embrapa Clima Temperado, which attempted to identify the species of caterpillars. They were placed in PVC tubes covered with voile and provided an olive shoot packaged in a tube containing cotton and water to maintain the shoot, these were kept in temperature-controlled room with a temperature of 25±2°C, UR 70±20% and 14 h photoperiod. For identification, adult individuals were sent to Dr. Vitor Osmar Becker.

RESULTS AND DISCUSSION

Eggs are white and flattened with reticular pattern and 0.5-1 mm length. Eggs are individually laid on the branches and leaves of olive trees (Fig. 1a). Young caterpillars, newly hatched until the 2nd or 3rd instar of *P. forficifera* are yellowish and gradually became greenish unto the 5th instar (Fig. 1b). The body maximum length is 18-20 mm. The pupae is brownish (Fig. 1c), with 12-16 mm length and 3-4 mm width. Caterpillars feed on shoots, the damage occurs by the reduction in leaf area (Fig. 1e) and in reduced production in the next year, once these shoots generate fruits. Before pupating, the caterpillar joins some leaves with silk filaments, pupating between leaves. The greatest attacks occur from January to March and the oviposition starts in November.

Adults are white with semitransparent wings, measuring approximately 30 mm; in the edge of the fore wings there is a brown band (Fig. 1d). Adults are nocturnal and mate two days after emerging, and females die immediately after laying eggs. The species present 2 to 5 generations per year, depending on the climate, with a greater number of generations in warmer climates. It is one of the major pests of olive groves worldwide. In producing countries, Italy, Spain, Greece, West Asia, North Africa, Portugal, Sweden, Poland, Japan and tropical America, the species found is *P. unionalis* Hübner (Khaghaninia and Pourabad, 2009; Hegazi et al., 2011). In Chile, the caterpillar was identified as *P. persimilis*, whose female is white and lays eggs on the shoots (Estay et al., 2009; Sanhueza and Escobar, 2009). In Peru, *P. quadristigmalis* (*Lepidoptera*: *Pyralidae*) (Beingolea and Torres, 1970) and *P. perssimilis* (Gómez, 1999; Lazo and Pozzuoli, 2004). In Uruguay, *P. forficifera* Munroe (Villamil and Albin, 2006). In Brazil, in the states of Minas Gerais and Santa Catarina it was identified as *P. perssimilis* (Chiaradia and Da Croce, 2008; Oliveira, 2010) and in the state of Rio Grande do Sul, as *P. unionalis* (Coutinho et al., 2009).

In total 267 caterpillars of *Palpita forficifera* were collected in all municipalities. The level of infestation of caterpillars in the groves ranged from 0 to 52.5%. The highest rate of infestation was in February in Santana do Livramento 52.5% in Pelotas also in February reached 42.5% in Bage the infestation rate reached 40% in the same month in Cachoeira do Sul was the highest in March, 27.5 and 22.5% in Rio Grande in April (Fig. 2).

Therefore the ongoing monitoring of this pest is necessary and the development of strategies for its control, such as the record of products for chemical control, and the use of natural enemies for biological control, given the significant loss in production caused by this caterpillar, which should be measured.

CONCLUSIONS

This is the first record of *Palpita forficifera* in olive groves in the Rio Grande do Sul, Brazil.

ACKNOWLEDGEMENTS

To the Brazilian National Council for Scientific and Technological Development (CNPq) for Doctoral scholarship to M.P. Ricalde; to the UFPel, for lessons learned in the doctoral program, and for laboratories for research; to Embrapa, for support in performing the study.

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Tables

Table 1. Areas of scales collections in Rio Grande do Sul State: location and characteristics of groves.

Municipalities	Location	Area (ha)	Spacing (m)	Age (years)	Cultivars*
Pelotas	31°40'54"S; 52°26'11"W	2	6×6	4-5	1, 2, 3, 4, 5, 6
Bagé	31°08'44"S; 54°11'42"W	2	7×2.80	4-5	1, 2, 3, 4, 5, 6
Rio Grande	31°08'42"S; 54°11'45"W	1.5	10×5	+40	7
Cachoeira do Sul	30°00'30"S; 52°51'53"W	40	6×4	4-5	1, 2, 3, 4, 5, 6
Santana do Livramento	31°08'42"S; 54°11'45"W	20	7×4	2-3	1, 2, 3, 4, 5, 6

* Cultivars: 1-'Arbequina'; 2-'Arbosana'; 3-'Koroneiki'; 4-'Frantoio'; 5-'Manzanilla'; 6-'Picual'; 7-'Galega'.

Figures

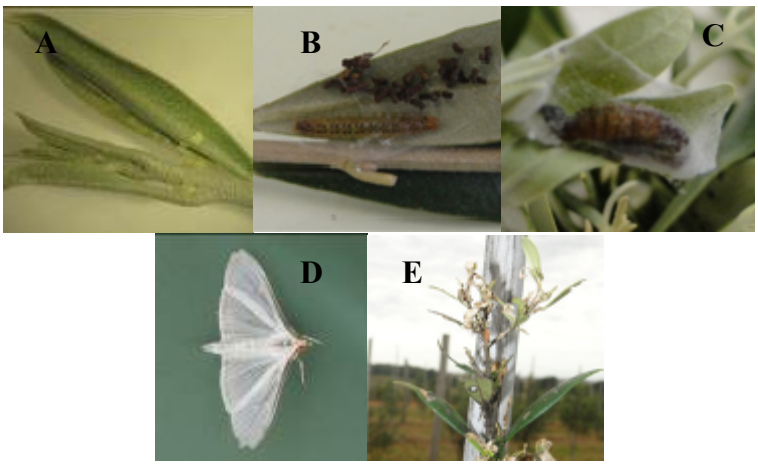

Fig. 1. A: eggs; B: caterpillar; C: pupae; D: adult; E: damages caused by *P. forficifera* (photo: Ricalde, M.P.).

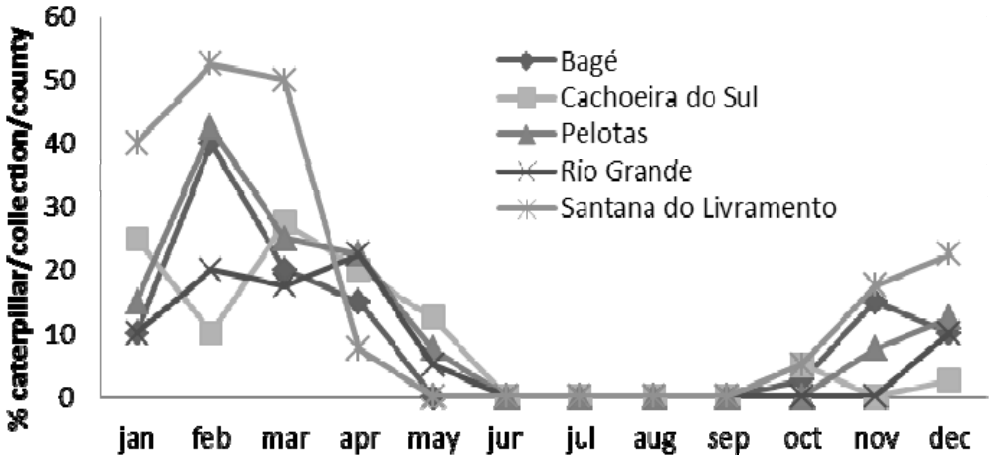

Fig. 2. Index infestation of *P. forficifera* collected monthly in olive shoots in five localities in Rio Grande do Sul, in the period out/2010-out/2012 represented as mean values.