SCIENTIFIC NOTE

Argyrotaenia sphaleropa (Meyrick) (Lepidoptera: Tortricidae) in Citrus in the State of Paraná, Brazil

Ana M. Meneguim and Celso L. Hohmann

Área de Proteção de Plantas, Instituto Agronômico do Paraná - IAPAR, Rod. Celso Garcia Cid, km 375, 86001-970 Londrina, PR, meneguim@iapar.br, celuiz@iapar.br

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Argyrotaenia sphaleropa (Meyrick) (Lepidoptera: Tortricidae) em Citros no Estado do Paraná

RESUMO - *Argyrotaenia sphaleropa* (Meyrick) está associada a várias espécies de frutíferas na América do Sul. Esse tortricídeo foi detectado pela primeira vez em citros, *Citrus sinensis* (L.) Osbeck no Brasil em pomares comerciais no norte do Paraná, durante a safra de 1994/95. O objetivo deste trabalho foi estudar a biologia do lepidóptero em condições de laboratório (28 ± 2ºC, 70 ± 10% RH, 14h fotofase) utilizando a cultivar Pêra. Lagartas obtidas a partir de massas de ovos, coletadas em pomar comercial de citros, em Rolândia, PR, foram individualizadas em frascos de vidro (8,5 x 2,5 cm) dentro dos quais foram inseridas folhas dos ponteiros de ramos de citros até que atingissem o estágio de adulto. Casais foram transferidos para gaiolas de acrílico (13 x 10 cm) contendo um bouquet de folhas de citros que serviram como substrato para oviposição. Os adultos foram alimentados com solução de mel a 10%. A duração do período de ovo a adulto foi de cerca de 36 dias. *A. sphaleropa* apresentou período de pré-oviposição ao redor de dois dias, período de oviposição de aproximadamente dez dias e período embrionário de cerca de seis dias. A longevidade de machos e de fêmeas foi de aproximadamente 15 e nove dias, respectivamente e a fecundidade de cerca de 180 ovos.

PALAVRAS-CHAVE: Ocorrência, biologia, *Citrus sinensis*

ABSTRACT - *Argyrotaenia sphaleropa* (Meyrick) is associated with various fruit species in South America. This tortricid was first detected in citrus, *Citrus sinensis* (L.) Osbeck**,** in Brazil, in commercial groves in northern Paraná, during the 1994/95-crop season. The aim of this work was to study the biology of this lepidopteran under laboratory conditions (28 ± 2ºC, 70 ± 10% UR, 14h photofase) using the citrus cultivar Pêra**.** Larvae obtained from egg masses collected in a commercial citrus grove in Rolândia, PR, were individually placed on citrus terminal leaves inside glass shell vials (8.5 x 2.5 cm) until adulthood. A male and a female moth were then transferred to acrylic cages (13 x 10 cm) containing inside a bouquet made with new citrus flush to serve as oviposition substrate. Adults were fed daily with a 10% honey solution. The biological parameters evaluated were duration of development of egg, larval and pupal stages; pupae weight; duration of pre-oviposition and oviposition periods, fecundity and longevity. The length of the egg to adult stage was around 36 days. The pre-oviposition period was almost two days, the oviposition period approximately ten days and the embryonary period around six days. Adult longevity was almost 15 days for females and nine days for males, and the lifetime fecundity was slightly over 180 eggs.

KEY WORDS: Occurrence, biology, *Citrus sinensis*

Argyrotaenia sphaleropa (Meyrick) is a common and widespread species in the new world (Trematerra & Brown 2004) causing damage on leaves and reproductive structures of numerous fruit, herbaceous and ornamental plant species in South America (Biezanko *et al*. 1957; Bentancourt & Scatoni 1986, 1995). In Brazil, the occurrence of *A. sphaleropa* has been reported in peaches (Botton *et al.* 2003), persimmons (Manfredi-Coimbra *et al.* 2005) and pears (Nora & Sugiura 2001 *appud* Botton *et al.* 2003). *Argyrotaenia* sp. was observed on citrus [*Citrus sinensis* (L.) Osbeck.] in Brazil, during the 1994/95-crop season, in commercial groves of the cultivars Pêra and Valência in northern Paraná (not publ.). Dr. Vitor O. Becker, in 1996, identified the insect as being *A. sphaleropa*. Gravena (2005) lists the genus *Argyrotaenia* amongst the various lepidopterous insects damaging orange trees. This species has also been reported on citrus in Uruguay

(Biezanko *et al.* 1957) and in Peru (Salazar Torres 1999).

The larvae of *A. sphaleropa* can cause damage by feeding on the new flush of citrus foliage as well as on newly formed or ripening fruits. Young larvae web terminal leaves or blossoms together feeding within them. Later on the larvae feed around the flower button or around the young fruit resulting in the drop of these structures. Large larvae feed among clusters of ripening fruits web together by silken threads, eating holes into the rind.

Citrus growers in northern Paraná can usually find this tortricid in their groves; occasionally, *A. sphaleropa* populations explode demanding control measures (A. Manjavick, pers. comm.). As no information on the biology of this lepidopteran on citrus is available, which is crucial for the development of an IPM program for this crop, we conducted laboratory studies to determine the basic insect life history parameters using citrus leaves as host.

The study was initiated with larvae obtained from egg masses collected in a commercial citrus (cv. Pêra) grove in Rolândia, PR. The eggs were maintained in moistened filter paper inside petri dishes until they hatched. The larvae were then individually placed in glass shell vials (8.5 x 2.5 cm) containing citrus terminal leaves (cv. Pêra) until adulthood. A male and a female moth were then transferred to acrylic cages (13 x 10 cm) inside of which it was placed a bouquet made with citrus foliage to serve as oviposition substrate. Adults were fed daily with a 10% honey solution. The biological parameters evaluated were duration of development of egg, larval and pupal stages; pupae weight; duration of pre-oviposition and oviposition periods, fecundity and longevity. In the determination of the length of the egg stage period, insects reared on a corn meal, yeast and wheat germ based artificial diet were used. The contamination of the egg masses laid on citrus foliage in laboratory with microorganisms did not allow the use of the natural host. The study was conducted under laboratory conditions (28 ± 2ºC, 70 ± 10% RH, 14h photofase).

The length of the egg stage period was approximately six days (Table 1), period similar to that obtained for *A. sphaleropa* reared on grape leaves (Bentancourt & Scatoni 1986, Bavaresco *et al.* 2005) and on apple, grape or persimmon leaves (Bavaresco *et al*. 2005). The duration of development from larvae to adult lasted ca. 30 days (Table 1), period slightly longer in comparison to that reported for larvae feeding on grape leaves (Bentancourt & Scatoni 1986, Bavaresco *et al.* 2005) or feeding on apple or persimmon leaves (Bavaresco *et al*. 2005). The increase in the life cycle of the insects reared on citrus leaves resulted from the slower larval development on this host. Female and male pupae weighed 11 mg and 9 mg, respectively; values much lower compared to the weight of pupae (male + female) reared on leaves of apple, grape or persimmon (Bavaresco *et al*. 2005). Such lower values, however, are due to a two-day delay on pupae weight determination. *A. sphaleropa* moths showed a pre-oviposition period of approximately two days (Table 1), which was lower than the duration reported by Bavaresco *et al.* (2005) on apple, grape or persimmon leaves (3-4 days). The oviposition period, ca. ten days (Table 1), was higher than that of insects reared on grape leaves, which was slightly over three days (Bentancourt & Scatoni 1986). However, a much higher oviposition period (14, 16 and 22 days, respectively) was showed for *A. sphaleropa* raised on apple, grape or persimmon leaves (Bavaresco *et al*. 2005). Adult longevity (Table 1) reached ca. 15 days for females and nine days for males. The longevity (male + female) was around 12 days, period comparable to that reported by Bavaresco *et al.* (2005) using apple leaves as host for *A. sphaleropa.* The lifetime fecundity of moths emerging from immatures reared on citrus terminals (Table 1) was ca. 180 eggs, fecundity similar compared to that of insects feeding on grape (Bentancourt & Scatoni 1986) and persimmon leaves (Bavaresco *et al*. 2005).

The fact that the main biological parameters of *A. sphaleropa* reared on citrus leaves were in general similar to those reported for larvae reared on apple, grape or persimmon leaves, combined to the establishment of the insect in commercial citrus groves in Brazil, is a strong indication that *C. sinensis* is a suitable host for this tortricid as well.

Taking into consideration the importance of the citrus industry in Brazilian economy, and the potential of *A. sphaleropa* occasionally reaching the status of pest in this commodity, we suggest that a sound IPM program should be developed to avoid the losses this insect may eventually cause.

Table 1. Duration (days) of developmental stages and reproductive periods, fecundity and longevity of *A. sphaleropa* on *C. sinensis* leaves. (28 ± 2°C, 70 ± 10% RH and 14h photophase)

	Mean ± s.e	n
Egg	6,0 ± 1,15	2381
Larvae	22,9 ± 0,55	74
Pupae	6,3 ± 0,90	35
Pre-oviposition	1,9 ± 0,33	13
Fecundity	180,8 ± 30,60	13
Longevity (female)	14,7 ± 1,62	9
Longevity (male)	8,7 ± 1,14	12

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