

SEASONAL DISTRIBUTION AND SEX RATIO OF *AUTOGRAPHA GAMMA* (L.)
AND *TRICHOPLUSIA ORICHALCEA* (FABRICIUS) (LEP., NOCTUIDAE)
FROM SÃO MIGUEL (AZORES)

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ABSTRACT

The adult dynamics of *Autographa gamma* (L.) and *Trichoplusia orichalcea* (Fabricius) (Lepidoptera, Noctuidae) were studied between July of 1988 and December of 1989, at Ribeira Grande, Arribanas and Lagoa do Congro on the island of São Miguel, using Pennsylvania blacklight traps.

Despite evidence for considerable density fluctuations, *A. gamma* was continuously present at the three locations. In contrast *T. orichalcea* was only captured the whole year at Ribeira Grande, during February and from September to November at Lagoa do Congro, and from September to December at Arribanas.

For any given species both sexes were captured simultaneously. In *T. orichalcea* males were more frequent than females only at Arribanas while at the other localities females of this species and of *A. gamma* were more abundant.

RESUMO

A dinâmica do estado adulto de *Autographa gamma* (L.) e *Trichoplusia orichalcea* (Fabricius) (Lepidoptera, Noctuidae) foi estudada entre Julho de 1988 e Dezembro de 1989, através de armadilhas luminosas do tipo pensilvânia instaladas em três localidades da ilha de São Miguel (Ribeira Grande, Arribanas e Lagoa do Congro).

Para as três localidades, foram evidenciadas flutuações de densidade consideráveis. *A. gamma* foi observada continuamente nas três localidades, enquanto *T. orichalcea* foi capturada durante todo o ano na Ribeira Grande, em Fevereiro e entre Setembro e Novembro na Lagoa do Congro e entre Setembro e Dezembro nas Arribanas.

Para as duas espécies, ambos os sexos foram capturados simultaneamente. O *sex-ratio* foi favorável às fêmeas, exceptuando para a localidade das Arribanas, onde os machos de *T. orichalcea* foram mais frequentes do que as fêmeas.

INTRODUCTION

The Azores allow for the development of a hundred and sixty one species of Lepidoptera (Vieira & Pintureau, 1993), many of which are con-

sidered as agricultural pests, e.g. Noctuid species (Tavares, 1989). The study of the adult flight curve can be an indirect way of predicting damages caused by some of them.

This paper is intended as a con-

tribution to the study of the adult dynamics of *Autographa gamma* and *Trichoplusia orichalcea* (Plusiinae). These species, which can have various generations per year, are largely polyphagic. *Autographa gamma* has a Palearctic distribution, whereas *T. orichalcea* is Tropical-Subtropical (Balachowsky, 1972; Calle, 1982). They are reported for all the islands of the Azorean Archipelago, except for Graciosa (Vieira & Tavares, this volume).

In order to evaluate the potential impact of these species on the regional agrosystem, a list of their host plants is also presented.

METHODOLOGY

Following Silva *et al.* (in press), the adult population dynamics of *A. gamma* and *T. orichalcea* were studied from July 1988 to December 1989 (i.e. 76 weeks), using Pennsylvania light traps placed at three locations on São Miguel island: Ribeira Grande (altitude 100 m, northern coast), Arribanas (250 m, interior South-southwest) and Lagoa do Congro (550 m, interior South-southeast).

Each light trap, equipped with a TLD 18W lightbulb, was installed at the edge of a permanent pasture field of Gramineae, lifted one meter over the ground. The captured specimens would fall into a container with formol at 5 %, to preserve the material. Adults were collected from trap-containers once a week. The biological material was washed, and the species of each adult was de-

termined. Records were made of species name, sex and date of capture for each specimen.

The number of captured adults per week for each species and the location were determined, the sex ratio was computed every week, and all female and male percentages were transformed by the arc-sin function, before applying a two factor analysis of variance.

Also, a bibliographic survey of the host plants of each studied lepidopteran was undertaken.

RESULTS AND DISCUSSION

Autographa gamma (L)

The total number of *A. gamma* adults captured in the light traps (Figure 1) was relatively low, i.e., 31 adults at Ribeira Grande, 70 at Arribanas and 9 at Lagoa do Congro. Whatever the location, this species was present throughout the year, except from November until January. The captures reached a maximum of 8 adults at Arribanas in May 1989. The sex ratio was favourable to females in all the studied locations (Ribeira Grande 77.4%, Arribanas 72.1% and Lagoa do Congro 66.7%).

Despite the low number of records, the two factor analysis of variance (capture places and number of males and females) shows significant differences among the three capture places ($F=2.9$, $p=0.0133$), mainly between Arribanas and Lagoa do Congro. Similarly, it happens between both sexes ($F=7.4$, $p=0.00674$), specially among these two localities.

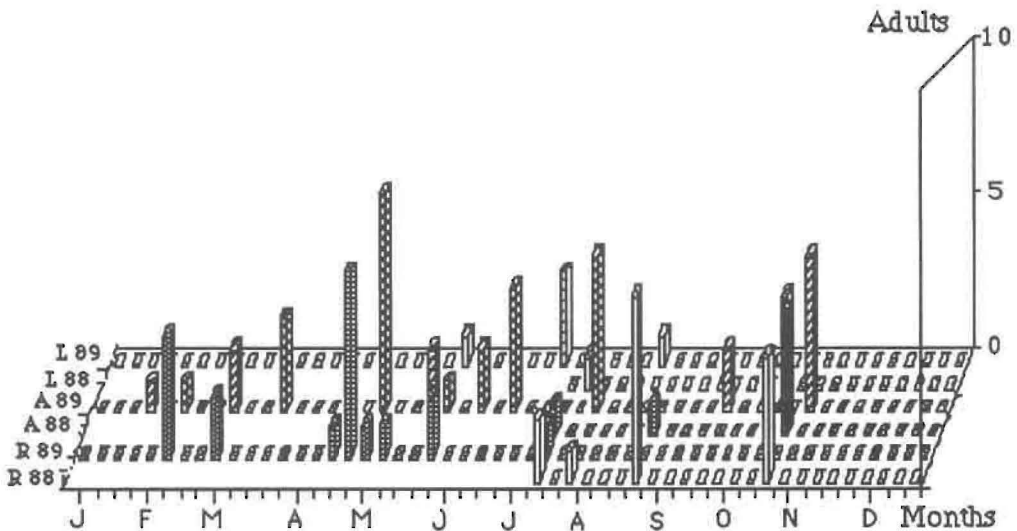


FIG 1. *Autographa gamma* adults captured at Ribeira Grande (R), Arribanas (A) and Lagoa do Congo (L) between July 1988 and December 1989.

The interaction between both factors is not significant ($F=1.1$, $p=0.328$).

A. gamma can find a large variety of plants (Table 1) distributed all over the year at the localities. This supports its life cycle and may justify its abundance throughout the year, although the numbers that appeared are rather low.

Trichoplusia orichalcea (Fabricius)

T. orichalcea was recorded at the three places (Figure 2), with a total of 68 adults captured at Ribeira Grande, 33 at Arribanas and 21 at Lagoa do Congo. This species was more abundant in February and from September to November at Lagoa do Congo; it was observed mainly during the second semesters of 1988

and 1989 at Arribanas. It was present throughout the year at Ribeira Grande, with a peak of 12 individuals in August of 1988.

Both sexes of this species were captured simultaneously. *T. orichalcea* males were more frequent than females only at Arribanas (78.1%), while at the other locations the females were more abundant (i.e. Ribeira Grande 51.5% and Lagoa do Congo 57.1%).

The two factor analysis of variance, performed in the same way as for the preceding species, showed no significant differences among capture places ($F=1.6$, $p=0.189$) or between the sexes ($F=1.4$, $p=0.101$). Also, the interaction between both factors is not significant ($F=0.5$, $p=0.649$).

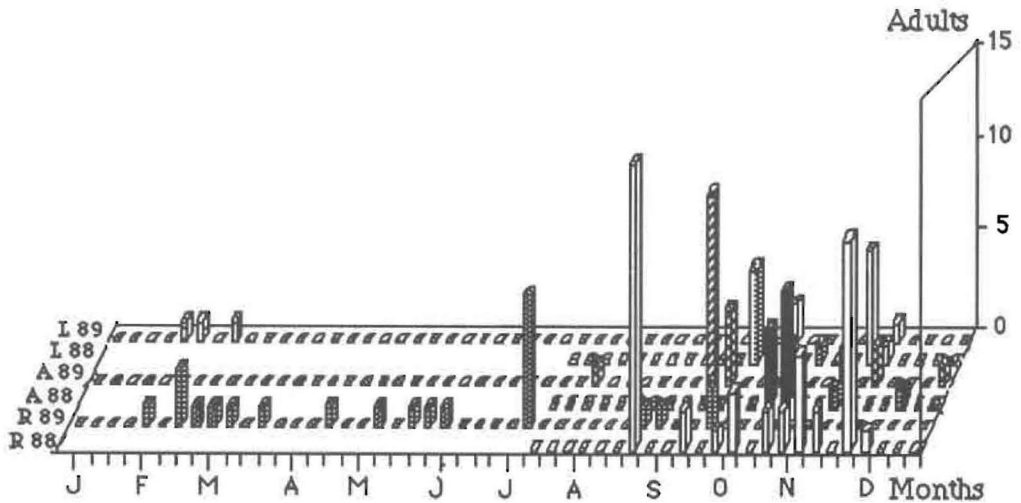


FIG. 2. *Trichoplusia orichalcea* adults captured at Ribeira Grande (R), Arribanas (A) and Lagoa do Congro (L), from July 1988 to December 1989.

The analysis of Table 1 shows that *T. orichalcea* is polyphagous, being able to attack a great number of vegetable crops cultivated in the Azorean islands.

REMARKS ON THE POTENTIAL IMPACT OF THESE SPECIES

By analysing the plants damaged by these two species we observed that both prefer vegetable crops (Table 1). *A. gamma* also appears on sugar beet, tobacco, pear trees, sunflower, corn and a variety of clovers.

The local biotopes show appropriate climatic characteristics for the development of any phase of the life cycle of *A. gamma* and *T. orichalcea* (Silva, 1992). Table 1 pre-

sents a large variety of host plants, cultivated in the Azores as crops, that would enable a higher abundance of adults (Figures 1 and 2), if we consider the fact that they are able to appear continuously through the year.

The number of adults captured (Figures 1 and 2), although still not alarming, may alter, if changes in the agro-ecosystem occur emphasizing some of these crops. In parallel, the correct management of the azorean agro-ecosystems should imply studies on larval population dynamics and economic costs of different levels of attack, as well as on the phenomena of hibernation, migration or sedentarism, in order to have a better knowledge about the biological cycle of those species.

TABLE 1. Plants damaged by *A. gamma* and/or *T. orichlacea* (according to Palhinha 1966; Balachowsky, 1972; Calle, 1982; Carneiro, 1982; Carvalho, 1984; Hächler, 1986; Hill, 1987; Carter & Hargreaves, 1988; Silva, 1992). * Found in many species of this taxon; (#) Crops cultivated in the Azores; (+) Crops not cultivated in the Azores.

Crop area	Host plants	<i>A. gamma</i>	<i>T. orichlacea</i>
Vegetable	+ * <i>Crocus sativus</i> L.		X
	+ artichoke - <i>Cynara scolymus</i> L.	X	
	# lettuce - <i>Lactuca sativa</i> L.	X	X
	# potatoe - <i>Solanum tuberosum</i> L.	X	X
	+ eggplant - <i>Solanum melongena</i> L.		X
	# onion - <i>Allium cepa</i> L.	X	
	# cale(s) - <i>Brassica oleracea</i> L (vars, cvs)	X	X
	# pea - <i>Pisum sativum</i> L.	X	X
	# bean - <i>Phaseolus vulgaris</i> L.	X	
	# * <i>Foeniculum vulgare</i> Mill.		X
	+ pigpee - <i>Cicer arietinum</i> L.		X
	+ mustard - <i>Sinapis alba</i> L.		X
	# nape - <i>Brassica napus</i> L. (vars, cvs)		X
	+ * <i>Salvia officinalis</i> L.		X
	+ soya been - <i>Glycine max</i> L.		X
Industrial	# sugar beet - <i>Beta vulgaris</i> L.	X	
	# tobacco - <i>Nicotiana tabacum</i> L.	X	
Fruit	# pear - <i>Pyrus comunis</i> L.	X	
Flower	# sunflower - <i>Helianthus annuus</i> L.	X	
Cereal	# corn - <i>Zea mays</i> L.	X	
Pastures and Forrages	# clover(s) - * <i>Trifolium</i> sp. (sps, vars, cvs)	X	

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