

PHORESY OF *SITEROPTES* (*SITEROPTOIDES*) SP (ACARI: PYGMEPHORIDAE) ON *HAEMATOBIA IRRITANS IRRITANS* (L.1758) (DIPTERA: MUSCIDAE) IN ARGENTINA.

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SUMMARY: The purpose of this contribution is to make known the presence of *S. (Siteroptoides)* sp as phoretic on *H. i. irritans* in the N. E. of Santa Fe Province (Argentina) and its prevalence in six consecutive months from September 1992 to February 1993. Several hundreds of horn flies were collected to determine the monthly prevalence of phoresy, study the form of attachment and morphological characteristics for identification under SEM. *S. (Siteroptoides)* sp was identified phoretic on *H. i. irritans*. This association had not been reported in the New World before. The prevalence varied between 10-13%, indicating that this association is well established in the study area. According to the type of attachment and the life stage of the mites involved, this relation cannot be included within the classical four types of phoresy, so the term "pygmephorid" is proposed for this fifth type. The implication of this association would involve some degree of disturbance in the flying capacity of the horn flies involved.

KEY WORDS: *Siteroptes*, *Siteroptoides*, Horn fly, *Haematobia irritans*, Phoresy, Argentina.

INTRODUCTION

In general, phoresy has been defined as a phenomenon in which one animal species actively seeks out and attaches to another animal species for a limited period of time, to get to a more suitable environment for the individual or its progeny. During this period the attached animal named "phoretic" ceases both feeding and development (FARISH & AXTELL, 1971). According to the developmental stage involved and the morphological degree of attachment, phoresy phenomenon has been classified into four types (FARISH & AXTELL, 1971; MOSER & CROSS, 1975; KRANTZ, 1978).

With reference to the species of *Haematobia irritans* (Linnaeus, 1758) lice and acarine phoresy have been reported. Within the former, *Haematopinus tuberculatus* (Burmeister, 1939) (Mitzmain, 1912) and *H. eurysternus* (Nitzsch, 1818) (ALLINGHAM, 1987) were described as phoretic on *Haematobia irritans exigua* (De Meijere, 1913). Within the mites, two species were found, *Ameranoetus hematobii* Ide & Mahunka, 1978 (Anoetoidea, Anoetidae) was described as phoretic on *Haematobia irritans irritans* in Florida, USA (IDE & MAHUNKA, 1978) and *Pediculaster domrowi* Rack 1975 (Pygmephoridae) for *H. i. exigua* in Queensland, Australia

(RACK, 1975). The genus *Pediculaster* Vitzthum 1931 as well as *Pigmephorellus* Cross & Moser 1971 were synonymized under *Siteroptes* Amerling 1861 because the first two genera are based on phoretomorphic forms of *Siteroptes* species (MOSER & CROSS, 1975). "Phoretomorph" describes the heteromorphic females specialized for phoresy (MOSER & CROSS, 1975; SMILEY & MOSER, 1976).

Earlier, CROSS (1965) had created the subgenus *Siteroptes* (*Siteroptoides*) for species occupying a great variety of habitats except insects and including cattle manure for breeding *H. irritans*. In the same monograph, he examines the genus *Pediculaster* including species caught from several muscoid flies and manure.

MARTIN (1978) published an identification key for the species of the subgenus *Siteroptes* (*Siteroptoides*).

S. (Siteroptoides) has not been reported as phoretic on *H. irritans* in the New World.

H. irritans appeared in South America in 1937 (FIASSON, 1943) and reached Argentina in October 1991 (LUZURIAGA *et alii*, 1992) and finally determined as *H. i. irritans* (TORRES *et alii*, 1993).

The purpose of this contribution was to make known the presence of *S. (Siteroptoides)* sp as phoretic on *H. i. irritans* in

Table 1 - Monthly prevalence of *S. (Siteroptoides)* sp phoretic on *H. i. irritans* at San Bernardo, Santa Fe Province (Argentina) during September 1992 through February 1993.

	MONTH OF COLLECTION					2
	9/92	10	11	12	1/93	
Number of <i>H. i. irritans</i> examined	55	285	415	310	290	446
Prevalence (in percentage)	11	10	12	13	12	11

the N. E. of Santa Fe Province (Argentina) and its prevalence in six consecutive months from September 1992 to February 1993.

MATERIALS AND METHODS

The study was carried out at San Bernardo, Department of 9 de Julio, Santa Fe Province, Argentina (28° 40' SL and 61° 32' WL) during the months of September through February 1993.

While searching for possible phoretic mites on *Haematobia irritans irritans*, several hundreds of these flies were collected monthly from the backs of cattle, using a hand net BioQuip^R.

The flies were killed by means of potassium cyanide gas and immediately fixed in a solution of ethylic alcohol and acetic acid (50:50). A total of 1801 *H. i. irritans* were examined in order to determine the monthly prevalence of phoresy.

Some flies and mites were prepared for observation under scanning electron microscopy (SEM) to study the distribution of the mites on the flies and their general morphology.

The technique employed was the following:

1. Successive washings in distilled water.
2. Dehydration in graded acetone (50-95°). One hour before drying by critical point, they were transferred to acetone 100° (twice).
3. Critical point dried with CO₂.
4. The specimens were stuck in bronze or copper stalls.
5. Gold metalized.
6. Observation under SEM.
7. Photograph documentation.

Other specimens were mounted on slides following ordinary proceedings using Hoyer's liquid as mounting medium.

RESULTS

Adult females of *Siteroptes (Siteroptoides)* sp were found phoretic both on males and females of *Haematobia irritans irritans* (figures 1 and 2). In general, the morphological characteristics are similar to those of *S. domrowi* (RACK, 1975) with slight discrepancies in the length and topographic placement of some idiosomal setae (figures 5 and 6).

S. (Siteroptoides) sp was found in bunches distributed mainly on the intersegmental membranes with high mobility: neck, thoracic-abdominal and coxal, but not in the tegular region. The number of mites per fly was variable, some flies had only five or six while others might carry up to 80 mites (figures 1,2 and 3).

The prevalence varied from 10 to 13% during the months of September through February (table 1).

S. (Siteroptoides) attached to *H. i. irritans* using specialized claws of the first leg protarsus. These claws are directed inwards (figure 4). The whole first leg pair is appreciably stout (figure 6).

DISCUSSION

The identification of this species as well as others included in the subgenus *S. (Siteroptoides)* presents difficulties because for certain species only one of the female morphs has been described and in other cases, the males are not known.

With regards to the species found, its determination is pending, as only the "phoretomorph" form has been found. In general, it is very similar to *S. domrowi* (RACK, 1975), differing slightly in the length and position of some idiosomal setae.

As suggested by MOSER & CROSS (1975) and according to the developmental stage and characteristics of fixation, the phoretic association between *H. i. irritans* and *S. (Siteroptoides)* would not fall within any of the four types of phoresy proposed by FARISH & AXTELL (1971). So the term "Pygmephorid" is proposed for this fifth type of phoresy involving the adult developmental stage fixed to the phoront by means of specially modified claws directed inwards.

In spite of the lack of information regarding the prevalence of phoresy for any species of the subgenus *S. (Siteroptoides)*, the fact of having found a prevalence of 10-13% in the present study during the most favorable months for *H. i. irritans* indicates that this kind of association is well established in the area of study.

The role of this association has yet to be demonstrated. Obviously, an important number of acari on the flies would exert some degree of disturbance in its movements and flying capacity. On the other hand, the "normal morphs", which might inhabit within the cattle manure (CROSS, 1965), could behave as predators of the horn fly larvae and egg as suggested by RACK (1975) and ATHIAS-BINCHE (1990). The morph shift as described for *P. fletcheri* (CROSS, 1988) and the life cycle for *S. (Siteroptoides)* has yet to be studied.

SUMÁRIO

O objetivo deste trabalho é tornar conhecida a presença de *S. (Siteroptoides)* sp, como forético de *H. i. irritans* no NE da Província de Santa Fé (Argentina), assim como a sua prevalência durante seis meses consecutivos, de setembro de 1992 a fevereiro de 1993. Algumas centenas de exemplares da Mosca-dos-Chifres foram coletados, para determinar a prevalência mensal da forésia, estudar a forma de acoplamento e as características morfológicas para a identificação sob microscopia eletrônica de varredura. *S. (Siteroptoides)* sp foi identificado como forético sobre *H. i. irritans*. Esta associação não foi anteriormente relatada no Novo Mundo. A prevalência oscilou entre 10 a 13% o que demonstra uma associação já bem estabelecida na área de estudo. Conforme o tipo de acoplamento e o estágio evolutivo do ácaro envolvido, tal relação não pode ser incluída dentro de qualquer um dos quatro tipos clássicos de forésia. Daí a proposta para o termo "pigmeforídeo" definindo um quinto tipo. A associação certamente deve causar algum grau



Fig.1-2. SEM photographs of *S. (Siteroptoides)* phoretic on *H. i. irritans*. 1: Male 2: Female

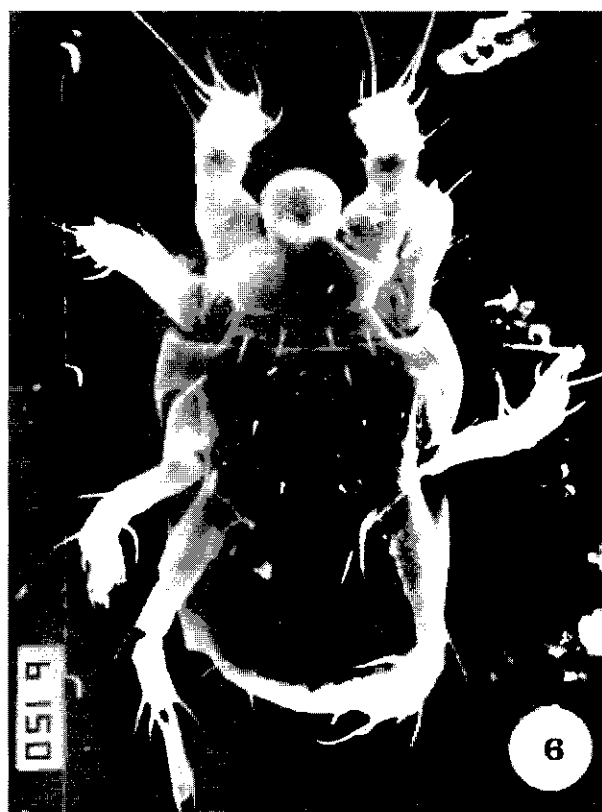
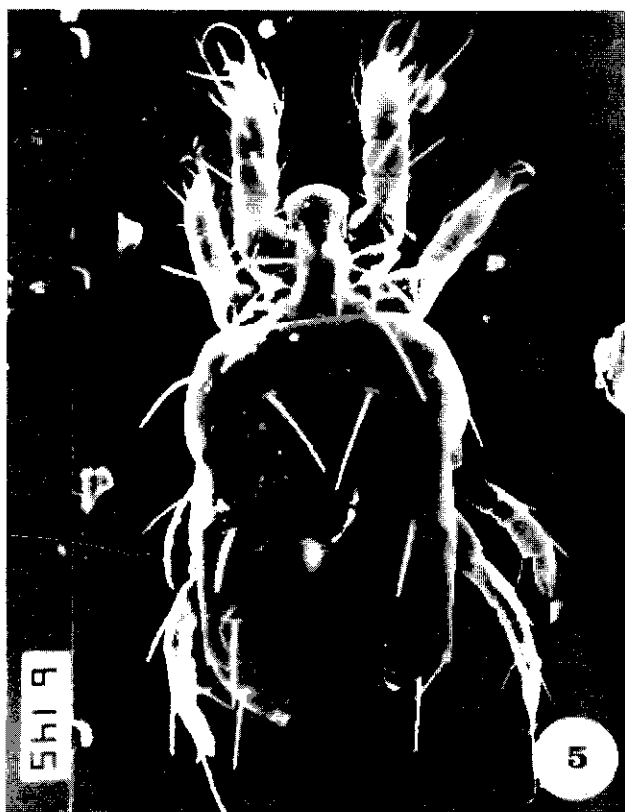


Fig.3. Dorsolateral view of *S. (Siteroptoides)* attached to the dorsum of *H. i. irritans* (SEM). Fig.4. Detail of the apical end of *S. (Siteroptoides)* right leg.
Fig 5-6. SEM photographs of *S. (Siteroptoides)*. 5. dorsal view 6. ventral view

de distúrbio na capacidade incursora das moscas, e na sua facilidade de vôo.

PALAVRAS-CHAVE: *Siteroptes*, *Siteroptoides*, Mosca-dos-Chifres, *Haematobia irritans*, forésia, Argentina.

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