

# THE SCIARID FAUNA (DIPTERA, SCIARIDAE) OF A *JUNIPERUS THURIFERA* L. FOREST OF THE MONEGROS REGION (ZARAGOZA, SPAIN) WITH DESCRIPTION OF TEN NEW SPECIES

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*The sciarid fauna (Diptera Sciaridae) of a Juniperus thurifera L. forest of the Monegros region (Zaragoza, Spain) with description of ten new species.*— The use of different trapping methods has produced a sample of 3388 specimens of sciarids belonging to eight genera and 35 species. This material contains ten new species of the genera *Trichosia* (*T. juniperi*), *Corynoptera* (*C. cincinnata*, *C. semipedestris*, *C. trispinulosa*), *Lycoriella* (*L. fuscorubroides*), *Bradysia* (*B. diversispina*, *B. variopalpa*), *Epidapus* (*E. spinosulus*) and *Parapnyxia* (*Parap. hispanica*, *Parap. intermedialis*). Some of the collecting methods and their effectiveness are compared.

Key words: Diptera, Sciaridae, New species, Los Monegros, Spain.

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## INTRODUCTION

The sciarid fauna of Spain has been poorly investigated up to now. STROBL (1900), CZERNY & STROBL (1909) and LENGERSDORF (1957) have reported only on a few species from various areas and described seven as new to science.

An intensive inventory of the taxa associated with *Juniperus thurifera* L. forests has been taking place in the Monegros region since 1990, as a mean of evaluating its natural values in order to campaign for legal protection for the area. MOHRIG & BLASCO-ZUMETA (1992) reported interesting sciarid material within the Monegros region

and described nine new species.

In this paper the results of a complex faunistic analysis carried out in 1990/1991 are presented, describing ten new species and comparing the efficiency of capture of three traps for the whole of the sciarid community.

## STUDY AREA

The Monegros region lies in the central part of the Ebro Valley, East of Zaragoza. The climate (OCHOA, 1982) is of the "arid continental" type, with temperatures which range yearly from -10°C to more than 40°C, low rainfall (200-400 mm) and frequent NW or

SE winds with considerable desiccating powers.

With such a climate, the Monegros is one of the most desert-like areas in the Iberian peninsula, and its vegetation often resembles that of the North African steppes (BRAUN-BLANQUET & BOLÓS, 1957)

For the faunistic study, on which this paper is based, the area where the vegetation has been least altered by man has been chosen: the *Juniperus thurifera* L. forest known as "Retuerta de Pina", near Pina de Ebro (UTM 30TYL29). The early designation of the area as Royal sheep-grazing grounds in 1273 (CANELLAS, 1988) saved it from the deforestation suffered by the rest of the region.

The remaining 2000 hectares of forest present a vegetation consistent with the current hypotheses on what the original structure of the vegetation must have been at an altitude of 300-400 m (BRAUN-BLANQUET & BOLÓS, 1957; WALTER, 1976; TERRADAS, 1986): a very open forest of *Juniperus thurifera* L., *Pinus halepensis* Mill. and *Juniperus phoenicea* L. that permits the presence of a scrub layer whose composition depends on local conditions (orientation and soil). Taking into account their relative importance in the area, sciarid samples have been collected in the following communities: *Agropyro cristati-Lygeetum sparti* Br.-Bl. & O. Bolós, steppe grasslands with perennial species on the deep soils found on not very steep hillsides and the foot of the hills; *Ononidetum tridentatae* Br.-Bl. & O. Bolós, dense, vigorous scrub mostly found on gentle sunny hillsides, which indicates the presence of a deep layer of gypsum; *Salsolo vermiculatae-Peganetum harmalae* Br.-Bl. & O. Bolós, a community of nitrophilous species found in abandoned fields and places where organic matter accumulates (mainly as a result of the presence of sheep);

*Helianthemum squamati* Br.-Bl. & O. Bolós, a community of low, stunted shrubs and a very important lichen component which is found on very eroded hilltops; *Suaedetum verae* Br.-Bl. & O. Bolós, dense aggregations of halophilous species which occur in places that have become saline owing to poor draining.

## MATERIAL AND METHODS

The sciarids were collected with different kinds of traps:

Moericke trap: a metal container, yellow inside and green outside, of 60x60x10 cm on a 70 cm high stand, filled with slightly soapy water. Both samples and water were removed once a week. There was one trap (supplied by the Animal Biology Department at the University of León, Spain), which remained in operation from May 1990 to December 1991, with two breaks, August-September 1990 and July-September 1991. The trap was set in typical *Ononidetum tridentatae* Br.-Bl. & Bolós dwarf scrub.

Malaise trap: two traps (courtesy of the Royal Institute of Natural Sciences, Belgium), 180x121x183-206 cm. The collecting liquid was alcohol (70% purity). They were in operation from September 1990 till December 1991, and were emptied once a week. The traps were set 23 m apart, in typical *O. tridentatae* scrub.

Coloured dishes: 25 plastic trays (9 yellow, 8 blue, 8 white) of 26x16x4 cm, filled with soapy water. They were in use from February 1990 to December 1991, set once in a fortnight in 1990, and left in operation for 24 hours on each occasion. They were constantly moved around within the Retuerta.

Light trap: it consists of two 20W/10S lamps (a blacklight lamp and a daylight one) operating on a 12V battery. No indirect

recovery systems was used, with the specimens being taken off the lamps by means of a pooter.

Pitfall trap: 12 plastic bottles, 14x8 cm with a 5 cm wide opening, were used. They were baited with beer or vinegar and buried just below the surface, with the lids off. They were placed 10 m apart in *O. tridentatae* scrub.

Sweeping from plants: the specimens were collected with a butterfly net on various plants species.

Collection of specimens found dead in containers full of water: these specimens floated on the surface of the water in man-made containers, the only water available in the area.

The irregularity in the use of these last four techniques gives the data a merely qualitative value. Thus, the frequency figures for captures, grouped by genera, have been analysed only for Moericke trap, Malaise trap and coloured dishes. For that purpose a  $X^2$  homogeneity test with a 2x3 contingency table (ZAR, 1984) has been made, applying the Bonferroni sequential correction (RICE, 1989) taking  $p=0.006$  as significance level. As an index of diversity is used the Shannon-Wiener Index,  $H'$  (MAGURRAN, 1988).

The phenology of the catches has been analysed seasonally in all samples, being considered that winter comprises January to March; spring, April to June; summer, July to September and autumn, October to December, and on a monthly basis in the case of the best-represented genera.

The holotypes of the new species are in the collection of W. Mohrig (Greifswald, Germany). Paratypes of the species *Trichosia juniperi* n. sp., *Corynoptera trispinulosa* n. sp., *Lycoriella fuscorubroides* n. sp., *Bradysia variopalpa* n. sp. and *Epidapus quadridentinus* n. sp. as well as a representative material of the other species will be stored in the Zoology Museum of Barcelona (Spain).

## Faunistic analyses

The sciarid material collected in the *Juniperus thurifera* L. forest of Retuerta de Pina by the above mentioned methods includes 1629 ♂♂ and 1759 ♀♀, which were determined to the species level (with the exception of some female specimens). These examples belong to 35 species of which nine have been described recently (MOHRIG & BLASCO-ZUMETA, 1992) and another ten which are new for science (table 1).

Although the original purpose of the sampling methods was a complete inventory of the arthropod fauna of the area and not to catch sciarids, notable differences ( $X^2 = 47.35$ , d.f. = 14,  $p < 0.0001$ ) are evident in the frequency of captures of each sciarid genus with the three main collecting methods. The Moericke trap traps a bigger percentage (59%) of specimens of the genus *Scatopsciara* Edwards, 1927 ( $X^2 = 21.72$ , d.f. = 2,  $p < 0.0001$ ), while the Malaise trap is better to catch *Trichosia* Winnertz, 1867 (27%) ( $X^2 = 17.65$ , d.f. = 2,  $p < 0.0001$ ). The dishes seem to be an all-purpose technique with the bigger diversity of captures ( $H' = 2.37$ , as opposed to 2.06 for Malaise trap and 1.73 for Moericke trap), and do not stand out as particular good for any individual genus, although they were the best method, in a marginal way and together with Moericke trap, to catch *Bradysia* Winnertz, 1867. There were no significant differences in the numbers of specimens of the remaining genera collected with the three techniques.

The global captures, grouped by seasons, appear in table 2. They suggest that the best season to collect sciarids is spring (52%), and the worst autumn (8%). In the case of those genera with the largest number of collected specimens (*Bradysia*, *Corynoptera*, *Scatopsciara* and *Trichosia*), the phenology of catches has been given a month-by-month treatment (fig. 1) and

Tabla 1. Number of specimens taken with each collecting technique: \* Species described in MOHRIG & BLASCO-ZUMETA (1992); MO. Moericke trap; MA. Malaise trap; CD. Coloured dishes; LT. Light trap; PT. Pitfall trap; SW. By swept; DW. Drowned in man-made containers for water.

Número de ejemplares recogidos con cada técnica de trapeo: \* Especies descritas en MOHRIG & BLASCO-ZUMETA (1992). (Para las abreviaturas ver arriba).

Species	Collecting method							Total
	MO	MA	CD	LT	PT	SW	DW	
<i>Bradysia atrorubens</i> Moh.*	–	1	1	–	–	–	–	2
<i>B. atropisina</i> Moh.*	–	–	5	–	–	–	–	5
<i>B. diversispina</i> n. sp.	–	–	–	–	–	1	–	1
<i>B. elobata</i> Moh.*	1	9	45	–	–	–	–	55
<i>B. ruginosa</i> Moh.*	1	14	21	–	–	–	4	40
<i>B. splendida</i> Moh. & Kriv.	–	1	2	5	–	–	–	8
<i>B. trivittata</i> (Staeg.)	99	46	154	490	–	8	–	797
<i>B. variopalpa</i> n. sp.	–	1	6	–	–	–	–	7
<i>B. xenoreflexa</i> Moh.&Bart.	–	–	–	–	–	1	–	1
<i>B. sp.</i>	–	6	1	–	2	1	9	19
<i>Corynoptera cincinnata</i> n. sp.	–	1	–	–	–	–	–	1
<i>C. contusa</i> Moh.*	–	4	27	–	–	–	–	31
<i>C. disporata</i> Moh.*	–	–	5	2	–	–	–	7
<i>C. perpusilla</i> Winn.	–	2	2	–	–	–	–	4
<i>C. praefurcifera</i> Moh.*	16	176	59	–	1	–	–	252
<i>C. praeparvula</i> Moh.&Kriv.	–	1	19	–	–	–	–	20
<i>C. saccata</i> Tuomik.	–	1	–	–	–	–	–	1
<i>C. semipedestris</i> n. sp.	1	–	–	–	–	–	–	1
<i>C. stipidaria</i> Moh.*	29	15	75	–	–	–	12	131
<i>C. trispinulosa</i> n. sp.	–	2	4	–	–	–	–	6
<i>C. sp.</i>	1	–	12	35	–	20	–	68
<i>Cratyna vagabunda</i> (Winn.)	–	4	2	–	–	–	–	6
<i>Epidapus gracilis</i> (Winn.)	–	–	1	–	–	–	–	1
<i>E. gracillimus</i> Moh.*	9	2	32	–	–	1	–	44
<i>E. spinosulus</i> n. sp.	–	1	4	–	–	–	–	5
<i>E. sp.</i>	–	1	–	–	–	1	–	2
<i>Lycoriella fucorum</i> Frey	9	6	31	–	–	–	–	46
<i>L. fuscorubroides</i> n. sp.	2	1	27	–	1	–	–	31
<i>L. morenae</i> (Strobl)	2	1	–	–	–	–	–	3
<i>L. nigripes</i> (Strobl)	–	1	–	–	–	1	–	2
<i>L. sp.</i>	3	1	–	–	–	7	–	11
<i>Parapnyxia intermedialis</i> n. sp.	–	–	5	–	–	–	–	5
<i>Parap. hispanica</i> n. sp.	–	–	1	2	–	–	–	3
<i>Scatopsiara subarmata</i> Moh. & Mam.	1	12	7	–	–	–	–	20
<i>S. vitripennis</i> (Meig.)	2	–	2	–	–	–	–	4
<i>S. vivida</i> (Winn.)	281	217	310	483	–	46	–	1337
<i>Trichosia juniperi</i> n. sp.	–	4	1	–	–	–	–	5
<i>T. quadristrigata</i> Strobl	–	1	–	–	–	–	–	1
<i>T. brevipalpa</i> Moh.&Menz.	24	190	188	–	–	–	3	405
Total	481	722	1049	1017	4	87	28	3388

the results show that each genus has a different peak of abundance during the year.

DESCRIPTION OF NEW SPECIES

*Trichosia juniperi* Mohrig & Blasco n. sp. (fig. 2)

Male: eye-bridge four facets wide. 4th flagellar segment twice as long as wide, with rather short, dense pilosity and a very short neck. Palpi three-segmented; basal segment narrow; 2nd and 3rd segments of equal size. Thorax, coxae and legs dark brown. Mesonotum with pale pilosity; with strong dark lateral, prescutellar and scute-

lar bristles. Postpronotum pilose. Wings with macrotricha on all posterior veins;  $r_1 = r$ ;  $c = 2/3 w$ ;  $y$  longer than  $x$ , both with macrotricha. Halteres brown. Tibia  $p_1$  with a weakly developed area of setae. Claws untoothed. Genital coxites with rather long pilosity on the inner side, the hairs not adpressed; styles narrowed at the apex, with a tooth and some fine spines. Tegmen broader than long; aedeagus long. Body length 3 mm.

Female: unknown.

Holotype: 1♂ 17 III 1990, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros region, Spain, coloured dishes in *A. cristati-L. sparti*, Blasco-Zumeta leg.

Paratypes: 1♂ 7 I 1991, Malaise trap;

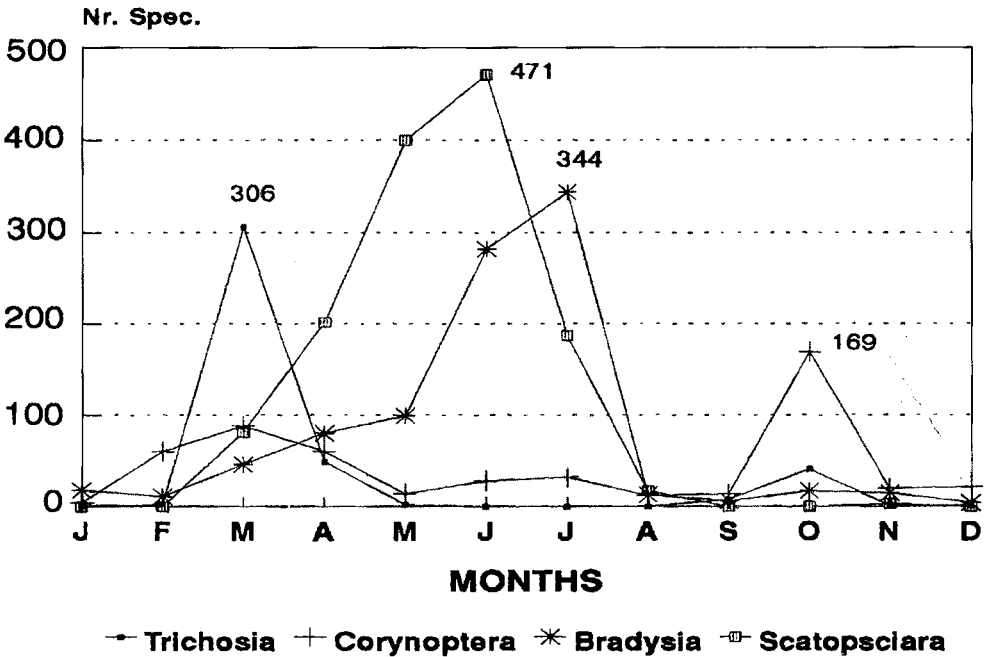
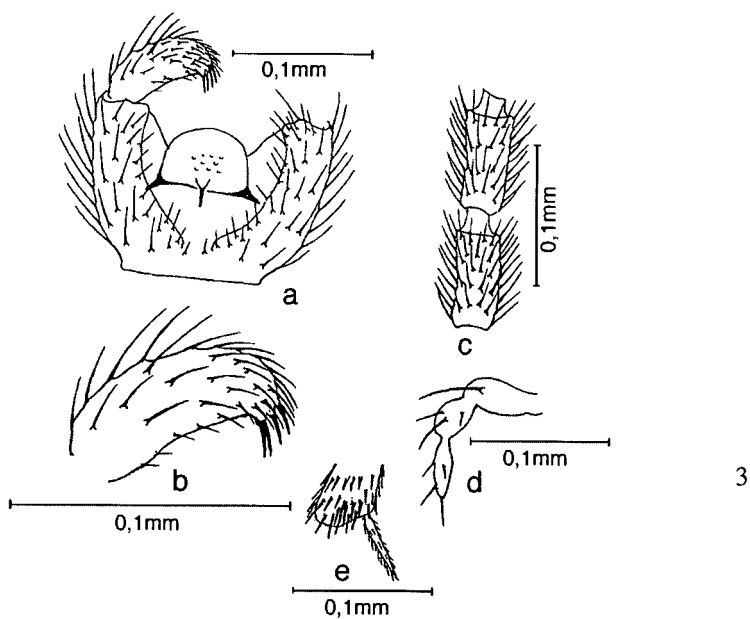
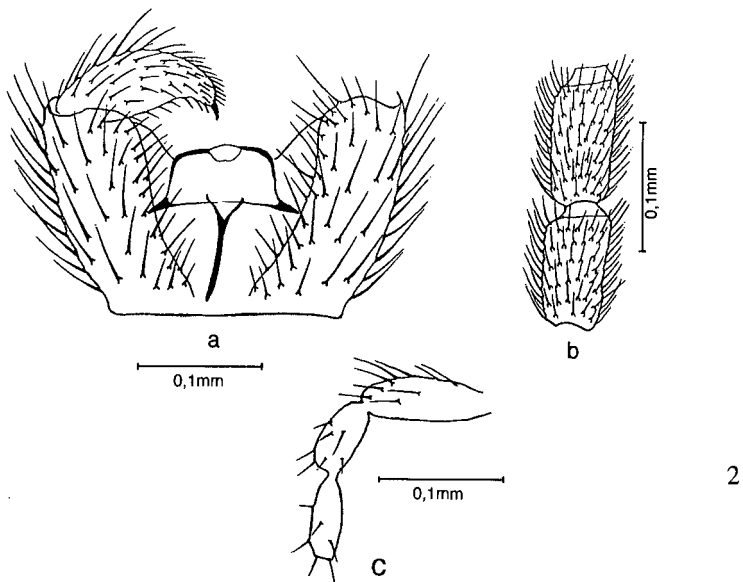


Fig. 1. Monthly distribution of catches in the best-represented genera. *Distribución por meses de las capturas de los géneros mejor representados.*



Figs. 2, 3. 2. *Trichosia juniperi* Mohrig & Blasco n. sp.: a. Male genitalia; b. 3rd-4th antennal segments; c. Palpus. 3. *Corynoptera cincinnata* Mohrig & Blasco n. sp.: a. Male genitalia; b. Style; c. 3rd-4th antennal segments; d. Palpus; e. Apex of tibia  $p_1$ .

2. *Trichosia juniperi* Mohrig & Blasco sp. n.: a. Genitalia masculina; b. 3<sup>er</sup>-4<sup>o</sup> segmentos antenales; c. Palpo. 3. *Corynoptera cincinnata* Mohrig & Blasco sp. n.: a. Genitalia masculina; b. Estilo; c. 3<sup>er</sup>-4<sup>o</sup> segmentos antenales; d. Palpo; e. Ápice de la tibia  $p_1$ .

1♂ 25 III 1991, Malaise trap; 1♂ 20 X 1991, Malaise trap; 1♂ 20 II 1991, Malaise trap; same locality, Blasco-Zumeta leg.

The new species belongs to the subgenus *Leptosciarella* Tuomikoski, 1960. It seems related to *T. longistilis* Hondru, 1968.

*Corynoptera cincinnata* Mohrig & Blasco n. sp. (fig. 3)

Male: eye-bridge three facets wide. 4th antennal segment 2.2 times as long as wide, with bristles. Palpi three-segmented, the segments of nearly equal size; the basal segment without a distinct sensory area and with one seta. Thorax brown, coxae and legs somewhat paler. Mesonotum dark-haired; some of the lateral and prescutellar hairs, and two of

the scutellar hairs, stronger. Wings normal;  $r_1 = 2/3 r$ ;  $c = 2/3 w$ ;  $y = x$ , without macrotricha;  $m$ -fork shorter than the  $m$ -stem. Halteres normal, darkened. Tibia  $p_1$  without a distinct trichiation. Claws without teeth. Genitalia with the inner sides of the coxites short-haired, styles with four hyaline spines on the apex; tegmen of aedeagus apically rounded, with a few fine teeth; aedeagus short. Body length 2 mm.

Female: unknown.

Holotype: 1♂ 20 X 1991, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros region, Spain, Malaise trap, Blasco-Zumeta leg.

The new species belongs to the *C. boletiphaga* group near the species around *C. furcifera* Mohrig & Mamaev, 1987. It is characterized by the shape of styles and the arrangement of their apical spines.

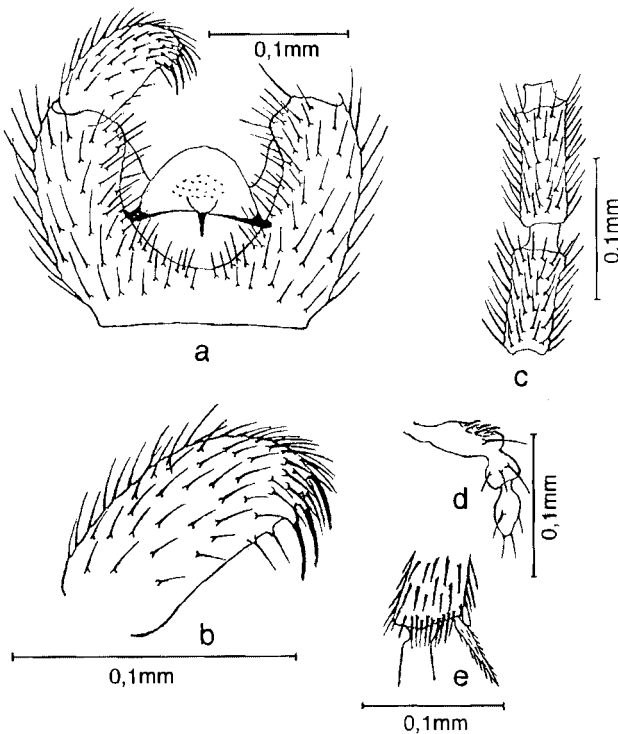


Fig. 4. *Corynoptera semipedestris* Mohrig & Blasco n. sp.: a. Male genitalia; b. Estilo; c. 3<sup>er</sup>-4<sup>o</sup> segmentos antenales; d. Palpo; e. Ápice de la tibia  $p_1$ .

*Corynoptera semipedestris* Mohrig & Blasco sp. n.: a. Genitalia masculina; b. Estilo; c. 3<sup>er</sup>-4<sup>o</sup> segmentos antenales; d. Palpo; e. Ápice de la tibia  $p_1$ .

Tabla 2. Seasonal distribution of catches, by species.  
*Distribución estacional de las capturas, por especies*

	Season				Total
	Winter	Spring	Summer	Autumn	
<i>Bradysia atrorubens</i> Moh.	1	-	1	-	2
<i>B. atropina</i> Moh.	-	-	4	1	5
<i>B. diversispina</i> n. sp.	-	-	-	1	1
<i>B. elobata</i> Moh.	35	7	-	13	55
<i>B. ruginosa</i> Moh.	25	2	1	12	40
<i>B. splendida</i> Moh.&Kriv.	-	-	8	-	8
<i>B. trivittata</i> (Staeg.)	4	440	346	7	797
<i>B. variopalpa</i> n. sp.	1	4	1	1	7
<i>B. xenoreflexa</i> Moh.&Bart.	-	1	-	-	1
<i>B. sp.</i>	9	7	2	1	19
<i>Cratyna vagabunda</i> (Winn.)	-	2	4	-	6
<i>Corynoptera cincinnata</i> n. sp.	-	-	-	1	1
<i>C. contusa</i> Moh.	2	2	-	27	31
<i>C. disporata</i> Moh.	-	-	7	-	7
<i>C. perpusilla</i> Winn.	1	2	1	-	4
<i>C. praefurcifera</i> Moh.	78	40	14	120	252
<i>C. praeparvula</i> Moh.&Kriv.	-	19	1	-	20
<i>C. saccata</i> Tuomik.	1	-	-	-	1
<i>C. semipedestrus</i> n. sp.	1	-	-	-	1
<i>C. stipidaria</i> Moh.	67	-	-	64	131
<i>C. trispinulosa</i> n. sp.	2	4	-	-	6
<i>C. sp.</i>	-	31	36	1	68
<i>Epidapus gracilis</i> (Winn.)	-	1	-	-	1
<i>E. gracillimus</i> Moh.	13	25	2	6	44
<i>E. spinosulus</i> n. sp.	1	2	1	1	5
<i>E. sp.</i>	1	1	-	-	2
<i>Lycoriella fucorum</i> Frey	23	21	-	2	46
<i>L. fuscobroides</i> n. sp.	-	31	-	-	31
<i>L. morenae</i> (Strobl)	2	1	-	-	3
<i>L. nigripes</i> (Strobl)	1	1	-	-	2
<i>L. sp.</i>	4	7	-	-	11
<i>Parapnyxia intermedialissp.</i> n.	4	1	-	-	5
<i>Parap. hispanica</i> n. sp. .	-	-	3	-	3
<i>Scatopsiara subarmata</i> Moh. & Mam.	-	8	12	-	20
<i>S. vitripennis</i> (Meig.)	-	4	-	-	4
<i>S. vivida</i> (Winn.)	81	10611	192	3	1337
<i>Trichosia juniperi</i> n. sp.	3	-	-	2	5
<i>T. quadririgata</i> Strobl	-	-	-	1	1
<i>T. brevipalpa</i> Moh.&Menz.	306	51	8	40	405
Total	666	1776	643	303	3388

*Corynoptera semipedestrus* Mohrig & Blasco  
n. sp. (fig. 4)  
Male: eye-bridge 2-3 facets wide. Antennae

long; 4th segment three times as long as wide, long-haired. Palpi rather short, three-segmented; the basal segment with a distinct



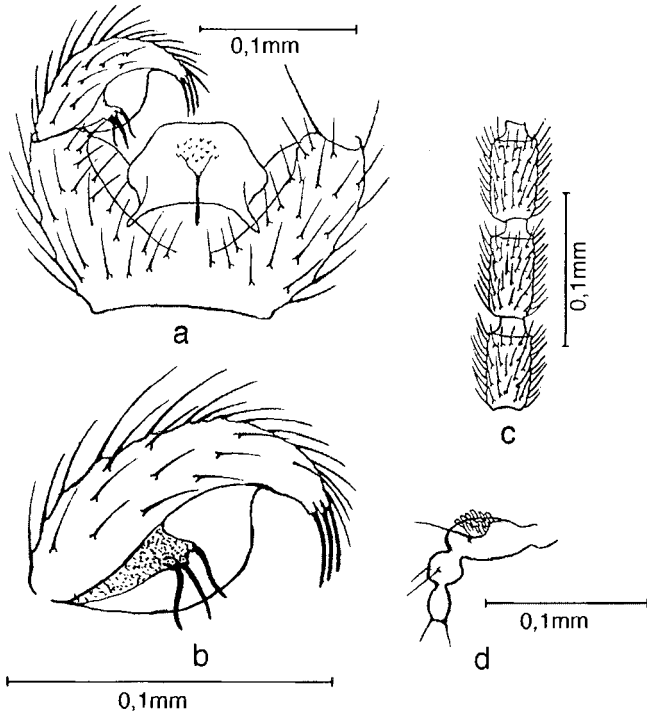


Fig. 5. *Corynoptera trispinulosa* Mohrig & Blasco n. sp.: a. Male genitalia; b. Style; c. 3rd-5th antennal segments; d. Palpus.

*Corynoptera trispinulosa* Mohrig & Blasco sp. n.: a. Genitalia masculina; b. Estilo; c. 3<sup>er</sup>-5<sup>o</sup> segmentos antenales; d. Palpo.

sensory area and one bristle; the 2nd segment rounded, the 3rd segment a little longer. Thorax, coxae and legs brown. Mesonotum with pale pilosity; some lateral, prescutellar and scutellar hairs a little longer. Postpronotum bare. Wings narrowed, without a distinct anal area;  $r_1$  short =  $1/2 r$ ;  $r_5$  short, extending only up to the middle of  $m$ -fork, so  $w$  is large and  $c$  a little longer than  $1/2 w$ ;  $y = x$ , without macrotricha. Halteres brown. Tibia  $p_1$  with comb-like bristles at the apex; claws toothless. Abdomen with fine pale pilosity. The inner side of the coxites densely clothed with hairs; styles with three hyaline spines among the long hairs. Tegmen apically rounded, with a large area of fine teeth. Aedeagus short. Body length 2.5 mm.

Female: unknown.

Holotype: 1♂ 25 III 1991, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros

region, Spain, coloured dishes in *A. cristati*-*L. sparti*, Blasco-Zumeta leg.

The new species belongs to the *C. trispina* group. It is characterized by the shape of the styles, the short palpi, elongated legs and the low thorax with a *Xylosciara*-like katepisternite.

*Corynoptera trispinulosa* Mohrig & Blasco n. sp. (fig. 5)

Male: eye bridge 2-3 facets wide. Antennae short; the 4th segment hardly twice as long as wide, with rather short, adpressed pilosity. Palpi short, three-segmented; the basal segment with a distinct sensory area and one bristle, as long as the 2nd and 3rd segments together; 3rd segment small, not longer than the 2nd segment. Thorax brown, coxae and legs slightly paler. Mesonotum short-haired, some lateral and two scutellar hairs somewhat

longer. Postpronotum bare, anteppronotum and prothoracic episternite with a few fine hairs. Wings narrowed, with a reduced anal area;  $r_1 = 1/2r$ ;  $c = 2/3w$ ;  $y = x$ , without macrotricha;  $m$ -fork shorter than the  $m$ -stem; the other veins of  $m$  and  $cu$  hardly visible. Tibia  $p_1$  without distinct apical trichiation. Claws toothless. Genitalia short-haired, the inner side of coxites with light pilosity. Styli strongly winged, the apex prolonged and with three long hyaline spines; basally on the ventral side with three spines on a distinct lobe before the basis of the styles. Tegmen broader than long, with a round area of fine teeth; aedeagus rather short. Body length 2.5 mm.

Female: unknown.

Holotype: 1♂ 9 IV 1991, Retuerta de

Pina, Pina de Ebro, Zaragoza, Monegros region, Spain, coloured dishes in *H. squamati*, Blasco-Zumeta leg.

Paratypes: 2♂♂ 25 III 1991, Malaise trap; 2♂♂ 9 IV 1991, coloured dishes in *H. squamati*; 1♂ 7 V 1991; coloured dishes in *O. tridentatae*, same locality, Blasco-Zumeta leg.

The new species belongs to the *C. parvula* group. The styli, with their three basal spines and prolonged apices, are good characters for identification.

*Lycoriella fuscorubroides* Mohrig & Blasco n. sp. (fig. 6)

Male: eye-bridge 3-4 facets wide. Antennae long; 4th flagellar segment 2.5 times as long

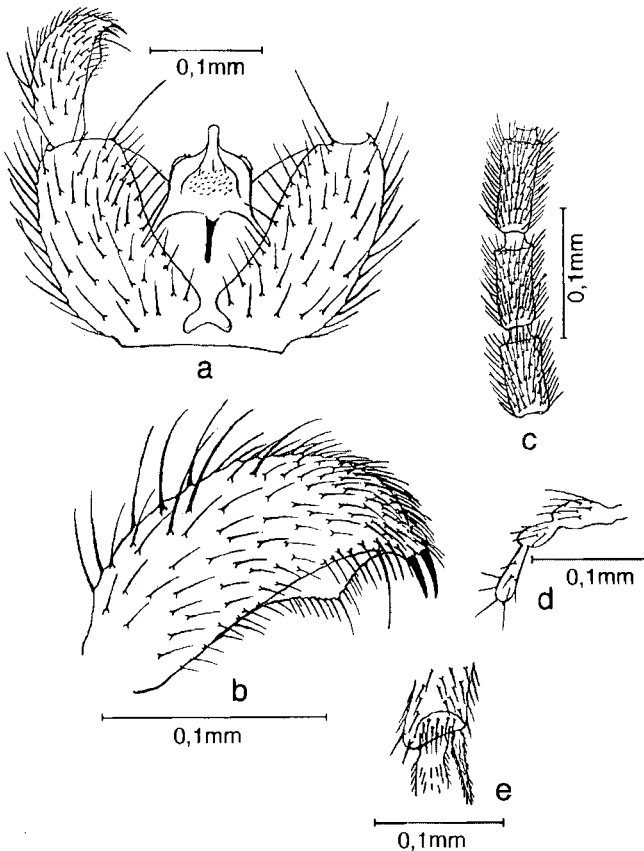


Fig. 6. *Lycoriella fuscorubroides* Mohrig & Blasco n. sp.: a. Male genitalia; b. Style; c. 3rd-4th antennal segments; d. Palpus; e. Apex of tibia  $p_1$ .

*Lycoriella fuscorubroides* Mohrig & Blasco sp. n.: a. Genitalia masculina; b. Estilo; c. 3<sup>er</sup>-4<sup>er</sup> segmentos antenales; d. Palpo; e. Apice de la tibia  $p_1$ .

as wide, with a distinct neck and the pilosity about as long as the segment's width. Palpi three-segmented; the basal segment without a sensory pit, with some bristles and as long as the third segment. Thorax, coxae and legs dark; postpronotum hairless; mesonotum with short, dark pilosity, the lateral hairs and some of the scutellar ones somewhat stronger. Wings brownish;  $r_1 = r$ , reaching almost to the basis of the medial fork;  $c = 2/3 w$ ;  $y$  about as long as  $x$ , with one or two macrotricha; medial and cubital veins thickened. Halteres darkened. The inner apex of the front tibia shows a lightly rounded area with bristles; claws toothless. Abdomen short-haired. Genitalia with strong coxites, the inner side without long pilosity, the basis between them without a lobe. The styles prolonged, the dorsal margin expanded subapically; apically

with two strong spines and a whip-lash hair near the spines. Tegmen of aedeagus apically into a lobe, with a large area of teeth. Aedeagus rather short. Body length 6 mm.

Female: unknown.

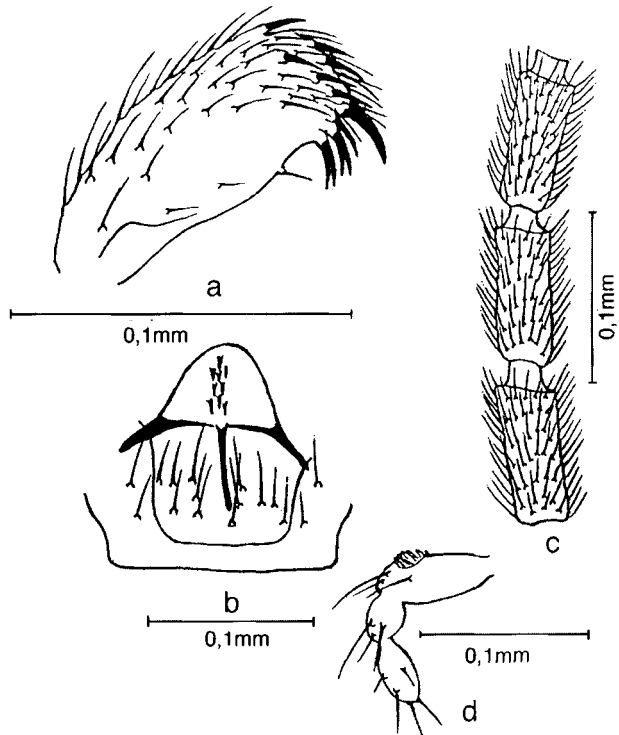
Holotype: 1♂ 26 IV 1991, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros region, Spain, coloured dishes in *O. tridentatae*, Blasco-Zumeta leg.

Paratypes: 1♂ 9 IV 1991, coloured dishes in *H. squamati*; 1♂ 20 IV 1991, Malaise trap; 17♂♂ 26 IV 1991, coloured dishes in *O. tridentatae*; 1♂ 7 V 1991, Moericke trap; 6♂♂ 7 V 1991, coloured dishes in *O. tridentatae*; 3♂♂ 7 V 1991; Malaise trap; 1♂ 10 V 91, pitfall trap with beer in *A. cristati-L. sparti*; same locality, Blasco-Zumeta leg.

The new species belongs to the *L. bruckii* group. It is a very large species and charac-

Fig. 7. *Bradysia diversispina* Mohrig & Blasco n. sp.: a. Style of male genitalia; b. Tegmen of aedeagus and base of hypopygium; c. 3rd-5th antennal segments; d. Palpus.

*Bradysia diversispina* Mohrig & Blasco sp. n.: a. Estilo de la genitalia masculina; b. Tegmen del eedeago y base del hipopigio; c. 3<sup>er</sup>-5<sup>o</sup> segmentos antenales; d. Palpo.



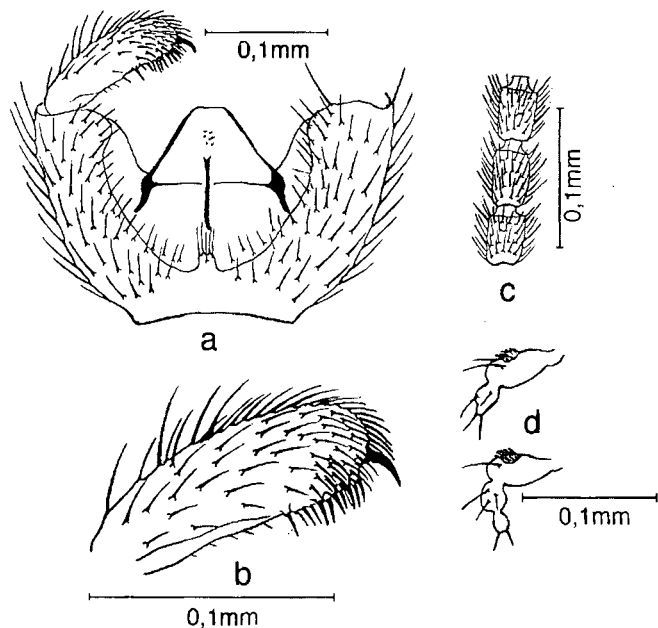


Fig. 8. *Bradysia variopalpa* Mohrig & Blasco n. sp.: a. Male genitalia; b. Style; c. 3rd-5th antennal segments; d. Palpi.

*Bradysia variopalpa* Mohrig & Blasco sp. n.: a. Genitalia masculina; b. Estilo; c. 3<sup>er</sup>-5<sup>o</sup> segmentos antenales; d. Palpos.

terized by the lobe on the inner side of the styles and the shape of the tegmen.

*Bradysia diversispina* Mohrig & Blasco n. sp. (fig. 7)

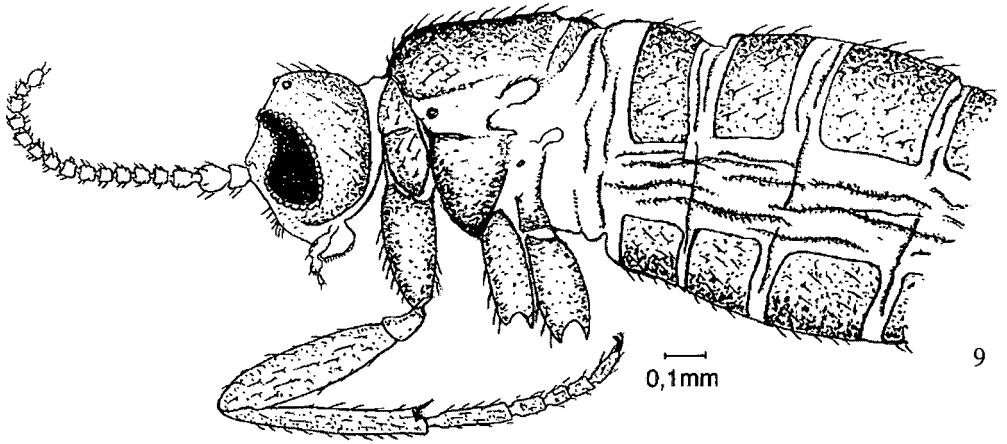
Male: eye-bridge three facets wide. Antennal segments rather long and with distinct necks; the 4th segment 3 times as long as wide, with pale setae; the two basal segments yellowish-brown, the other segments dark. Palpi three-segmented; the basal segment with three bristles and a distinct sensory pit; the two other segments together a little longer than the basal ones. Thorax dark, coxae and legs

yellowish-brown. Mesonotum with dark hairs, the lateral, prescutellar and two scutellar hairs strong. Wings light brownish, narrow, without an anal lobe, with a very short  $r_1$  ( $= 1/2r$ ) and a narrow  $m$ -fork. Halteres normal and darkened. Anterior tibia with the typical comb, claws without teeth. Genitalia without a basal lobe between the coxites, but with some setae on the membranous base; the inner side of the coxites short-haired; styles compact, with a strong tooth among 8-10 shorter spines; tegmen of aedeagus triangular, with a longitudinal area of teeth. Aedeagus prolonged. Body length 2.5 mm.

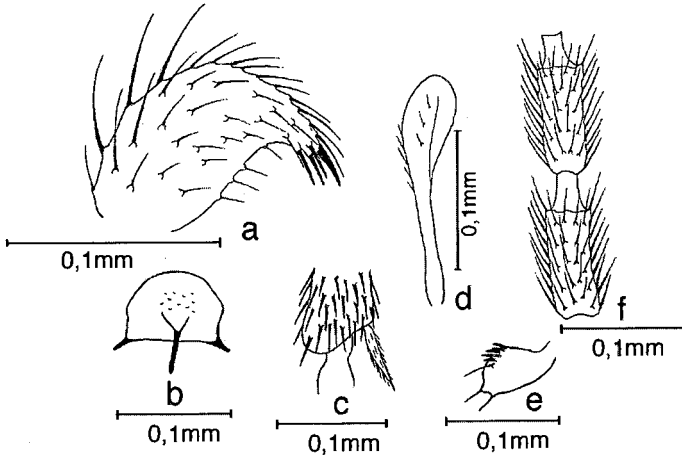
Female: unknown.

Figs. 9-11. 9. *Bradysia variopalpa* Mohrig & Blasco n. sp., ♀: anterior part of body, thorax with reduced wings and halteres. 10. *Epidapus spinosulus* Mohrig & Blasco n. sp.: a. Style; b. Tegmen of aedeagus; c. Apex of tibia  $p_1$ ; d. Haltere; e. Palpus; f. 3rd-4th antennal segments. 11. *Parapnyxia intermedialis* Mohrig & Blasco n. sp.: a. Male genitalia; b. Palpus; c. 3rd-4th antennal segments.

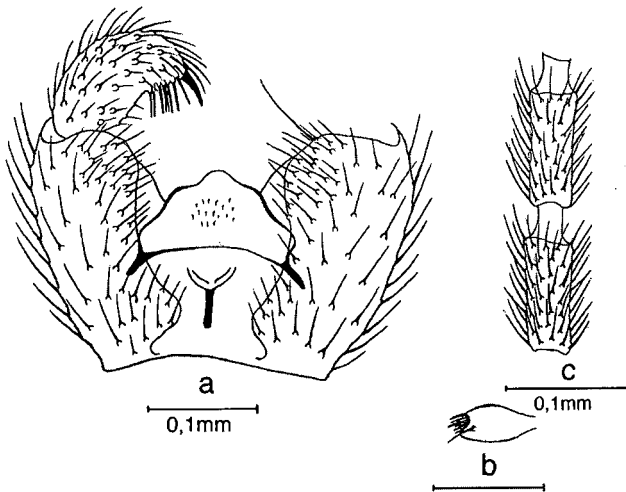
9. *Bradysia variopalpa* Mohrig & Blasco sp. n., ♀: parte anterior del cuerpo, tórax con alas y halteres reducidos. 10. *Epidapus spinosulus* Mohrig & Blasco sp. n.: a. Estilo; b. Tegmen del eedeago; c. Ápice de la tibia  $p_1$ ; d. Halterio; e. Palpo; f. 3<sup>er</sup>-4<sup>o</sup> segmentos antenales. 11. *Parapnyxia intermedialis* Mohrig & Blasco sp. n.: a. Genitalia masculina; b. Palpo; c. 3<sup>er</sup>-4<sup>o</sup> segmentos antenales.



9



10



11

**Holotype:** 1♂ 5 X 1991, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros region, Spain, found inside a dry stem of *Onopordum nervosum* Boiss., Blasco-Zumeta leg.

The new species belongs to the *B. rufescens* group, although it lacks a distinct basal lobe at the basis of the hypopygium. This taxonomic position is based on the strong teeth at the apex of the styles and the structure of the tegmen.

*Bradysia variopalpa* Mohrig & Blasco n. sp. (figs. 8, 9)

**Male:** eye-bridge narrow, only two facets wide. Antennae short, the flagellar segments with short necks and a little longer than wide, covered with setae about as long as the segment's width. Palpi shortened, with two or three segments; the basal segment large and with a distinct sensory pit, the other segments together shorter than the basal ones. Thorax, coxae and legs dark brown. Mesonotum with pale hairs, some of the lateral hairs, and two of the scutellar ones, longer. Wings narrowed and without an anal area;  $r_1$  shorter than  $r$ ;  $c$  a little longer than  $1/2 w$ ;  $y = x$ , without macrotricha. Halteres normal, brownish. Abdomen pale-haired. Genitalia with a small lobe on the base, with 5-6 bristles; the inner side of the coxites short-haired; styles with a strong apical tooth, subapically with short spines; tegmen of aedeagus conically narrowed, with a round area of teeth. Aedeagus prolonged. Body length: 2.5 mm.

**Female:** micropterous; eye-bridge narrow, 2-3 facets wide. Antennae very short; 4th segment as long as wide, with a very short neck and with rather bristly pilosity. Prefrons very short-haired. Palpi three-segmented, the basal segment large, with a flat sensory area and two bristles, the 2nd and

3rd segments short and rounded. Wings and halteres reduced to very small knobs. The dorso-lateral sclerites of the thorax (mesonotum, scutellum, metanotum and the upper part of the pleura) are fused and have lost their sutures. Thoracic dorsum as short-haired as the abdominal tergite. Coxae and legs are shortened. Fore tibia with a small comb of bristles; claws toothless and tibial spurs short. Body length 2.5 mm.

**Holotype:** 1♂ 14 IV 1990, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros region, Spain, coloured dishes in *H. squamati*, Blasco-Zumeta leg.

**Paratypes:** 1♂ 3 III 1990, coloured dishes in *S. vermiculatae*-*P. harmalae*; 1♂ 1♀ 25 IV 1991, coloured dishes in *O. tridentatae*; 1♂ 21 VI 1989, coloured dishes in *S. verae*; 1♂ 6 VII 1990, coloured dishes in *O. tridentatae*; 1♂ 20 X 1991, Malaise trap; same locality, Blasco-Zumeta leg.

The new species belongs to the *B. rufescens* group and is close to *B. confinis* (Winnertz, 1867). It is well characterized by the shape of the styles in conjunction with the short flagellar segments of the antennae. It is the first species of *Bradysia* with micropterous females.

*Epidapus spinosulus* Mohrig & Blasco n. sp. (fig. 10)

**Male:** eye-bridge 1-2 facets wide. Antennal segments prolonged to the end; 4th segment only 2.5 times as long as wide, the 10th segment about 4 times as long; pilosity sparse, adpressed and bristly; necks about  $1/3$  as long as the basal part. Palpi one-segmented, small, without a sensory pit, forward-pointing and with 2-3 bristles. Thorax, coxae and legs brown. Mesonotum with dark pilosity; some lateral, dorsocentral and prescutellar hairs, and two of the scutellar ones, long. Postpronotum bare, the anteppronotum and

prothoracic episternite with a few fine hairs. Wings narrowed and without an anal area;  $r_1 = 1/2 r$ ;  $c = 2/3 w$ ;  $y = x$ , with 1-2 macrotricha;  $m$ -fork shorter than the  $m$ -stem and not very widely opened. Halteres prolonged. The apex of the fore tibia with an irregular area of bristles; claws toothless. Genitalia with rather long hairs on the inner ventral side of the coxites; styles basally enlarged, apically curved, with a medium-sized tooth at the apex and three hyaline subapical spines basally. Tegmen not large, with a few fine teeth. Aedeagus not long. Body length 2 mm.

Female: unknown.

Holotype: 1♂ 9 IV 1991, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros region, Spain, Malaise trap, Blasco-Zumeta leg.

Paratypes: 1♂ 18 II 1991, coloured dishes in *A. cristati*-*L. sparti*; 1♂ 3 VII 1991, coloured dishes in *S. vermiculatae*-*P. harmalae*; 1♂ 25 IV 1991, coloured dishes in *O. tridentatae*; ♂ 26 X 1991, coloured dishes in *H. squamati*, same locality, Blasco-Zumeta leg.

The new species belongs to *Epidapus* s. str. and seems to be related to *E. microthorax* (Börner, 1903). The species is characterized

by the shape of the styles together with the position of its apical spines.

*Parapnyxia intermedialis* Mohrig & Blasco n. sp. (fig. 11)

Male: eye-bridge two facets wide. Antennae long, the flagellar segments prolonged and tapering; the 4th segment 3 times as long as wide, with a long neck (1/4 of the length of the basal part) and with conspicuously adpressed hairs. Palpi one-segmented, with a small sensory pit at the apex. Thorax, coxae and legs brown; pronotum hairless; mesonotum with fine hairs, lateral and scutellar hairs a little longer. Wings narrow, lacking the anal area;  $c$  shorter  $1/2 w$ ;  $r_1 = 1/2 r$ ; media fork short and widely opened; basal veins variable. Halteres short, but normal in size and shape. Coxae narrow and rather prolonged; the inner apex of the fore tibia without distinct trichiation, the tibial spurs of  $p_2$  and  $p_3$  rather short and equal; claws toothless. Genitalia without a basal lobe; coxites rather short-haired on the inner side; styli with a strong apical tooth and 6-7 subapical hyaline spines; tegmen irregularly triangular and broader than long, with fine teeth; aedeagus short. Body length 2 mm.

Female: unknown.

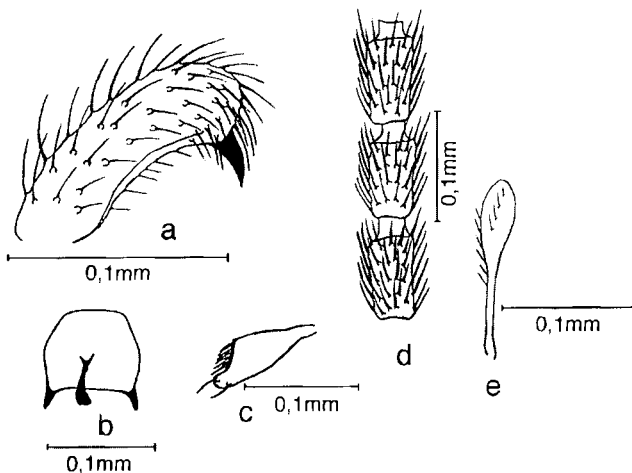


Fig. 12. *Parapnyxia hispanica* Mohrig & Blasco n. sp.: a. Style; b. Tegmen of aedeagus; c. Palpus; d. 3rd-5th antennal segments; e. Haltere.  
*Parapnyxia hispanica* Mohrig & Blasco sp. n.: a. Estilo; b. Tegmen del aedeago; c. Palpo; d. 3<sup>er</sup>-5<sup>o</sup> segmentos antenales; e. Halterio.

Holotype: 1♂ 9 IV 1991, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros region, Spain, coloured dishes in *H. squamati*, Blasco-Zumeta leg.

Paratypes: 1♂ 17 III 1990, coloured dishes in *A. cristati-L. sparti*; 3♂♂ 25 III 1991 coloured dishes in *A. cristati-L. sparti*, same locality, Blasco-Zumeta leg.

The new species belongs to the genus *Parapnyxia* Mohrig & Mamaev, 1970. Its taxonomic position is close to that of *Parap. germanica* Mohrig, 1970. Diagnostic characters are the shape and spines of the styles, the small sensory pit of the one-segmented palpi and the adpressed hairs of the antennae.

*Parapnyxia hispanica* Mohrig & Blasco n. sp. (fig. 12)

Male: eye-bridge narrow, one facets wide. Antennae rather short; 4th segment twice as long as wide, with a short neck and conspicuously adpressed hairs. Palpi one-segmented, with a large sensory pit at the apex. Thorax, coxae and legs brown. Mesonotum short-haired, sides and scutellum without any longer hairs. Postpronotum hairless. Wings very narrow, lacking the anal area; *c* shorter 1/2 *w*; the *m*- and *cu*-veins hardly visible. Halteres normal, not prolonged. Coxae *p*<sub>1</sub> narrow and very long; tibia *p*<sub>1</sub> without distinct trichiation; the tibial spurs of *p*<sub>2</sub> and *p*<sub>3</sub> short and equal in size; claws toothless. Abdomen very short-haired. Genitalia without a basal lobe; coxites short-haired on the inner side; styli prolonged, all with a very strong subapical tooth and the apical setae as long as the tooth; tegmen large and longer than broad; aedeagus fairly short but rather robust. Body length 1.5 mm.

Female: unknown.

Holotype: 1♂ 21 VII 1991, Retuerta de Pina, Pina de Ebro, Zaragoza, Monegros

region, Spain, coloured dishes in *O. tridentatae*, Blasco-Zumeta leg.

Paratypes: 1♂ 15 VII 1991, light trap; 1♂ 25 VIII 1990, light trap; same locality, Blasco-Zumeta leg. A male of this species has been collected in the Isle Crete (I. Eue leg.).

*Parapnyxia hispanica* is a species with the typical characters of the genus *Parapnyxia*. The very strong tooth of the styles and the short flagellar segments of antennae are good characters for identification.

## DISCUSSION

There are not previous works comparing the relative efficiencies of different traps to catch sciarids in the Iberian peninsula or in Europe. Our studies show clear differences between three types of general-use traps and permit selection of the most adequate type for the intended genus.

The ecological investigations reported here are the first with a detailed determination of sciarid flies in Spain. The species complex in the juniper woods of the "Retuerta de Pina" is highly original and differs strongly from the species complex of the coniferous forests of Central Europe.

The high proportion of new species, 19 out of a total of 35 detected species, including the nine described in a previous paper (MOHRIG & BLASCO-ZUMETA, 1992) suggests that the sciarid fauna of at least the central and southern areas of Spain must be quite different from the well-known Central European fauna. It is to be assumed that further investigations in other biotopes of Spain will bring a lot of new species and a better understanding of the distribution of species and the zoogeographical situation of the dipterous family Sciaridae in the Mediterranean area.



The discovery of a new species is a priori an interesting fact and enriches taxonomic knowledge in every case. Of the ten new taxa described here, the two species of the genus *Parapnyxia* are especially important. The previously known species of *Parapnyxia* are endemic to the deserts of Central Asia (Karakum, Kysylkum) with the exception of one species that occurs in Germany, in arid microclimates with gypsum soil (*Parapnyxia germanica* Mohrig, 1970). All the species are more or less micropterous in the case of the males. The known females are apterous and live in microcaverns of the soil or in the desert sand. They can be collected only with Barber traps or in the soil samples of Berlese traps.

The detection of this genus in the Monegros further confirms the presence in the area of taxa with an Ibero-Pontic distribution, a result of pre-Quaternary migratory movements originating in the East. Such taxa confirm the importance of the area as a major centre of Tertiary speciation and define it as a fossil Miocene landscape (BRAUN-BLANQUET & BOLÓS, 1957; BLANCHE & MOLERO, 1986) and point clearly to the need to preserve an area full of natural and scientific values which is at the moment under all kinds of threats (PEDROCCHI, 1988; PEDROCCHI & SANZ, 1991).

## RESUMEN

*La fauna de esciáridos (Diptera, Sciaridae) de un bosque de Juniperus thurifera L. de la comarca de Monegros (Zaragoza, España) con descripción de diez nuevas especies.*

La utilización de diversas técnicas de trapeo de invertebrados en un bosque de *Juniperus thurifera* L. en la comarca de Los Monegros (Zaragoza, España) ha permitido la captura de 3388 ejemplares de esciáridos pertenecientes a ocho géneros y 35 especies (tabla 1). Se describen 10 nuevas especies

pertenecientes a los géneros *Trichosia* (*T. juniperi*), *Corynoptera* (*C. cincinnata*, *C. semipedestris*, *C. trispinulosa*), *Lycoriella* (*L. fuscorubroides*), *Bradysia* (*B. diversispina*, *B. variopalpa*), *Epidapus* (*E. spinosulus*) y *Parapnyxia* (*Parap. hispanica*, *Parap. intermedialis*). La comparación entre los tres principales métodos de trapeo y su efectividad, muestra la idoneidad de la trampa Moericke para el género *Scatopsiara* y la trampa Malaise para el género *Trichosia*, mientras que los platos de colores aparecen como un sistema de trapeo poco selectivo. Se analiza también la fenología de capturas agrupadas por estaciones (tabla 2) resultando la primavera como la mejor época para coleccionar esciáridos y el otoño la peor. Para los cuatro géneros con mayor número de especímenes (*Bradysia*, *Corynoptera*, *Scatopsiara* y *Trichosia*) se muestra la fenología de capturas con carácter mensual (fig. 1) presentándose diferentes picos de abundancia. La detección en Los Monegros del género *Parapnyxia* subraya la importancia del área como centro de especiación con origen en el Terciario.

## ACKNOWLEDGEMENTS

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## REFERENCES

- BLANCHE, C., & MOLERO, J., 1986. Las cubetas arceicas al sur de Bujaraloz (Valle del Ebro). Contribución a su estudio fitocenológico. *Lazaroa*, 9: 277-299.
- BRAUN-BLANQUET, J. & BOLÓS, O., 1957. Les groupements végétaux du bassin moyen de l'Ebre et leur dynamisme. *An. Est. Exper. Aula Dei*, 5(1-4): 1-266.
- CANELLAS, A., 1988. *Diplomatario medieval de la casa de Ganaderos de Zaragoza*. Real Sociedad Aragonesa de Amigos del País, Zaragoza.
- CZERNY, L. & STROBL, G., 1909. Spanische Diptere III. Beitrag. *Verh. Zool.-bot. Ges. Wien*, 59(3-4): 121-301.
- LENGERSDORF, F., 1957. Zoologisch-systematische Ergebnisse der Studienreise von H. Janetschek und W. Steiner in die Spanische Sierra Nevada 1954. III. Neue *Lycoriiden*

- (Sciaridae) (Ins., Diptera). *Ber. österr. Akad. Wiss. (math.-nat.)*, Wien, 166 (5-6): 227-229.
- MAGURRAN, A. E., 1988. *Ecological diversity and its measurement*. Croom Helm Eds., London.
- MOHRIG, W. & BLASCO-ZUMETA, J., 1992. New Sciarid flies (Diptera, Sciaridae) from the Monegros region (Zaragoza, Spain). *Misc. Zool.*, 16: 93-104.
- OCHOA, M. J., 1982. Relaciones entre el medio y comunidades vegetales del sabinar continental árido en el Valle del Ebro. INIA, Madrid.
- PEDROCCHI, C., 1988. *Evaluación preliminar del Impacto Ambiental de los Regadíos en el Polígono Monegros II*. M.O.P.U.-I.P.E.
- PEDROCCHI, C. & SANZ, M. A., 1991. El sistema Endorreico de Monegros: un ecosistema en vías de extinción. *Lucas Mallada*, 3: 93-106.
- RICE, W. R., 1989. Analyzing tables of statistical test. *Evolution*, 43: 223-225.
- STROBL, G., 1900. Spanische Dipteren. X. Teil. *Wien. Ent. Ztg.*, Wien, 19(5-5): 92-100.
- TERRADAS, J., 1986. El paisatge vegetal dels Monegros: assaig d'interpretació. *Orsis*, 2: 71-95.
- WALTER, H., 1976. Consideracions ecològiques sobre les condicions de vegetació a la conca de l'Ebre. In: *Vegetació i Climes del Món*: 1-219 (H. Walter, Ed.). Universidad de Barcelona, Barcelona.
- ZAR, J. H., 1984. *Biostatistical Analysis*. Prentice-Hall International Ed., New Jersey.