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Two new species of *Hyoidea* REUTER from Spain (Insecta: Hemiptera: Miridae: Orthotylinae)

With 28 figures and 2 tables

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Abstract. *Hyoidea lopezcoloni* sp. n. from Madrid and *Hyoidea stehliki* sp. n. from Almería are described. Both new species live on *Ephedra fragilis* which occurs in Southern and Central Spain in different regions, isolated from each other. A third, until now undescribed *Hyoidea* species exists in the provinces of Saragossa, living on *Ephedra nebrodensis*, and Madrid, living on a further but not yet identified *Ephedra* species. From these new records it is supposed that in Spain there is a center of development of new species of the genus *Hyoidea*. The pygophore of the north African species *Hyoidea lindbergi* is illustrated here for the first time.

Resumen Los autores describen dos nuevas especies de *Hyoidea* de la Península Ibérica, *Hyoidea lopezcoloni* de Madrid e *Hyoidea stehliki* de Almería. Ambas especies viven sobre *Ephedra fragilis* en dos regiones climáticamente distintas y aisladas entre sí. Una tercera especie de *Hyoidea* ha sido encontrada en la provincia de Zaragoza sobre *Ephedra nebrodensis*, y Madrid, sobre una especie de *Ephedra* no identificada. En este momento un tercio de la especies conocidas del género se encuentran en España, ello permite suponer que la Península ibérica es un centro de especiación del género *Hyoidea*. El pygóforo de *Hyoidea lindbergi*, una especie norteafricana, se figura por primera vez en este trabajo.

Key words. Hemiptera, Miridae, Orthotylinae, *Hyoidea*, new species, Spain.

Introduction

The family Ephedraceae with the single genus *Ephedra* comprises near 60 species widespread over Europe, Central Asia, the Mediterranean region, West of the United States, Mexico, the Andes and the Patagonian region.

Associated with these shrubs there is an interesting fauna of several insect orders, among them the Heteroptera too. In the family Miridae there are several genera living on *Ephedra* as for example the genus *Hyoidea* REUTER, 1876.

HOBERLANDT (1963) revised the genus, duplicating the numbers of described species and put the basis of the modern knowledge of the genus. Twenty six years later, LINNAVUORI (1989) added one new species, and recently CARAPEZZA (1997) described *Hyoidea hannothiauxi* from Tunisia.

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The six species of the genus (KERZHNER & JOSIFOV 1999) have the present distribution: *H. notaticeps* REUTER, 1876, is known from Central Europe, Ukraine, Southern European Russia, Kazakhstan, Northern China, Georgia, Tadzhikistan and Turkmenistan, *H. horvathi* MONTANDON, 1890, is known only from the type locality in central Algeria, *H. kerzhneri* HOBERLANDT, 1963, is known from Central Asia, Caucasus, Turkey and Israel, *H. lindbergi* HOBERLANDT, 1963, lives in Morocco and Tunisia. *H. hermione* LINNAVUORI, 1989, is known only from southern Israel, and finally *H. hannothiauxi* CARAPEZZA, 1997, is known by a single male collected in Tunisia.

In the Iberian peninsula the genus *Hyoidea* was unknown until today. In addition to the two new species from Southern and Central Spain described in this paper, a third new *Hyoidea* species occurs in Central and Northern Spain (RIBES & RIBES in press).

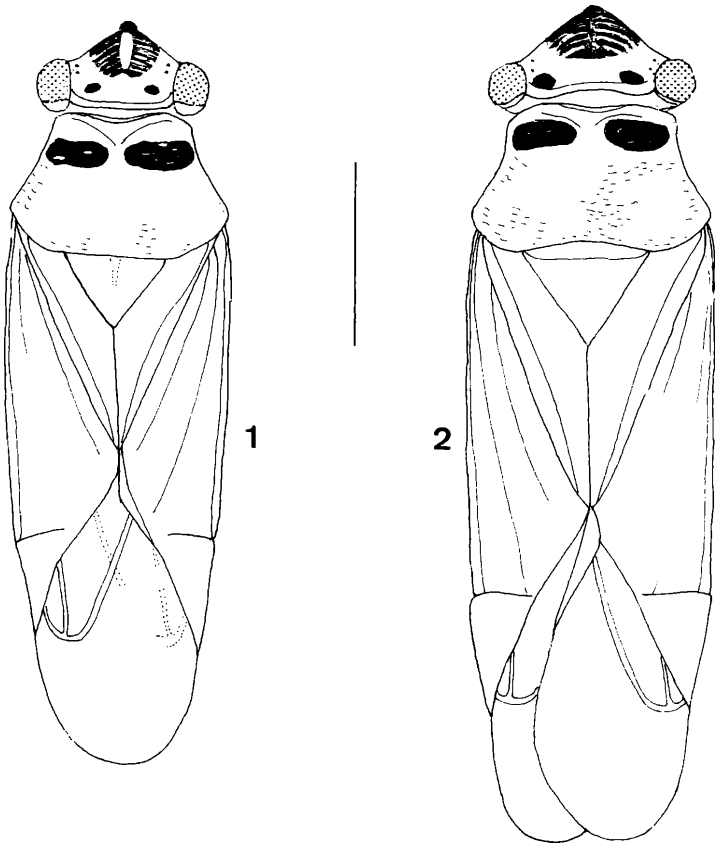
In our opinion, the Iberian Peninsula presents a center of development for the genus *Hyoidea.* The presence of three species of *Ephedra* in our region, *E. fragilis, E. distachya* and *E. nebrodensis*, the diversity of habitats and the fragmentary distribution of these plants, in combination with the short period of appearance of the *Hyoidea* adults, allow to suppose that still more species may live in the Iberian countries.

Description of new species

Hyoidea lopezcoloni sp. n. (figs 1–14, 26)

Lenght of body 3.62 to 3.95 mm (♂) and 3.62 to 4.45 mm (♀). Body elongated parallel-sided, 3.08 to 3.52 times (♂) and 2.90 to 3.41 times (♀) as long as broad (measurements see table 1). General coloration more or less brown olive. Head, anterior border of pronotum and lower surface of body yellowish. Borders of thoracic sternites black. Pleura spotted reddish. Abdominal sternites green yellowish, ochraceous in the genital segments, especially in the females.
Head with oblique dark bands in the front and with two big dark spots in the vertex, close to the eyes. Two small dark spots (two on each side) between the eyes and the oblique dark bands in the front. Tylus black or with a yellow median longitudinal stripe. Vertex carinated transversally. Head 1.37 to 1.41 times (♂) and 1.28 to 1.42 times (♀) as broad as high. Ocular index 2.50 to 2.81 in the males and 2.60 to 3.25 in the females.
Males with black antennae, in the females the first and basal two third of the second segment brown, the remaining third and the third and fourth segment black. (In one female coloration equal to that in the male antennae). First antennal segment thick, 0.52 to 0.67 times (♂) and 0.46 to 0.61 times (♀) as long as the synthlipsis. Second antennal segment 0.81 to 1.15 times (♂) and 0,66 to 1,07 times (♀) as long as the width of the pronotum.
Anterior border of the pronotum yellow. Anterior angles few dilated and with or without small setigerous dark points. Lateral and posterior borders sinuated. Humeral angles rounded. Pronotal callosities black or with lighter spots, shiny and smooth. Hind lobe finely striated. Scutellum equilateral. A median longitudinal lighter band on pronotum and scutellum. Pronotum 1.57 to 1.78 times (♂) and 1.53 to 1.74 times (♀) as wide as its length, and 1.05 to 1.16 times (♂) and 1.06 to 1.18 times (♀) wider as the diatone
The rostrum reaches the middle coxae.
Two kinds of hairs cover the body: Adpressed white scale-like setae and very short semierect brown hairs. Membrane finely striated longitudinally outside of the closed cells. Legs brown reddish. Femora with rows of dark spots. Tarsi black.

Male genitalia see figs. 3 to 14 and 26. Genital capsule (fig. 26) with a long and acute dent at the left side and another small one at the right. A small tooth in the posterior border. Right style (figs. 3 to 6) with a strong dentate plate. Left style (figs. 7 to 11) with long hypophysis and with



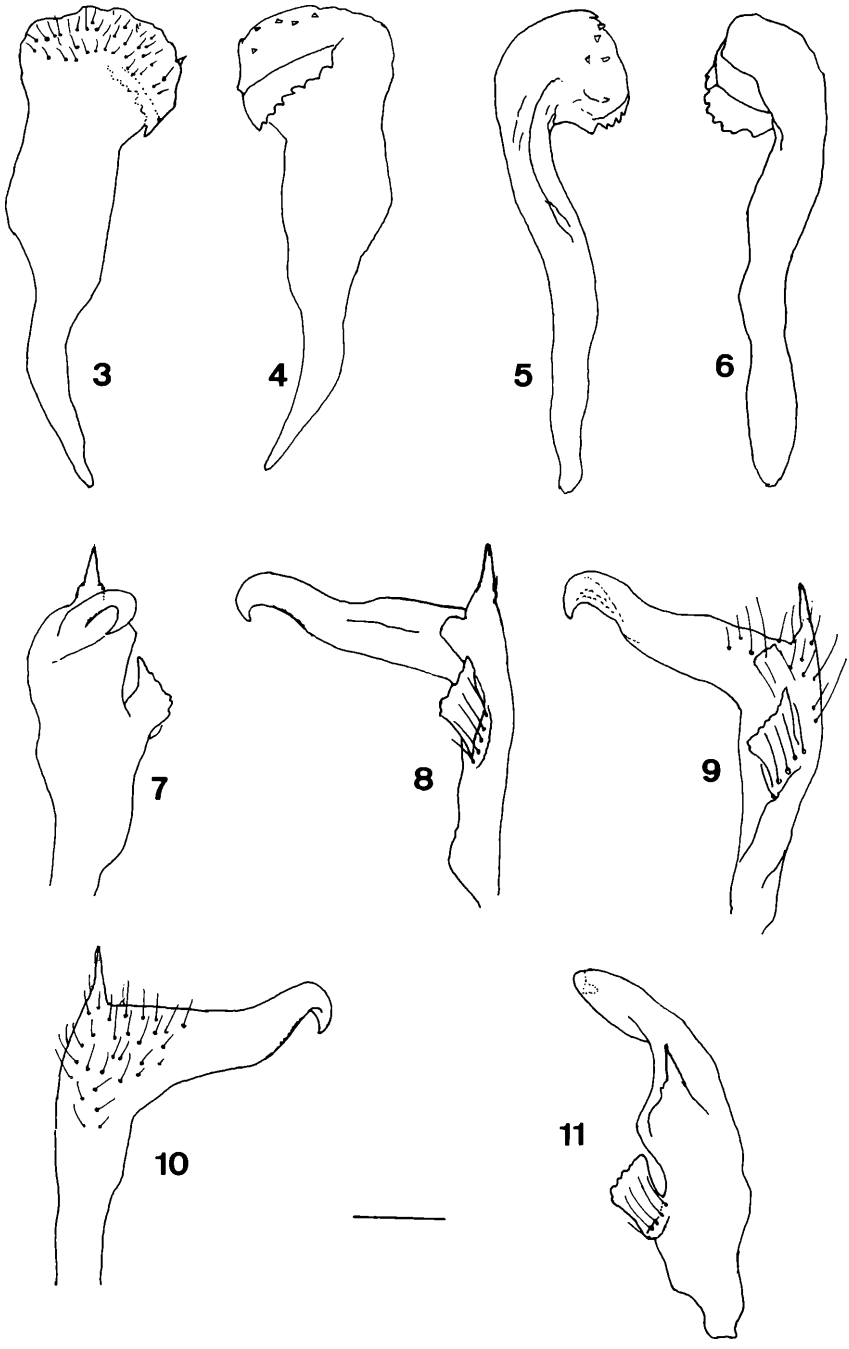
Figs 1–2: *Hyoidea lopezcoloni* sp. n., habitus; 1, male; 2, female. (Scale line 1 mm).

an apex recurved into a hook. Upper process of the sensory lobe acutely dentated and with a rounded tubercle, lower process with a combed lamina. Three vesical appendages (figs. 12 to 14), one long, acute, poorly dentated in the apex, the second broad, S-shaped, plate-like, both sides dentated, the third spatulated and serrated only at one side

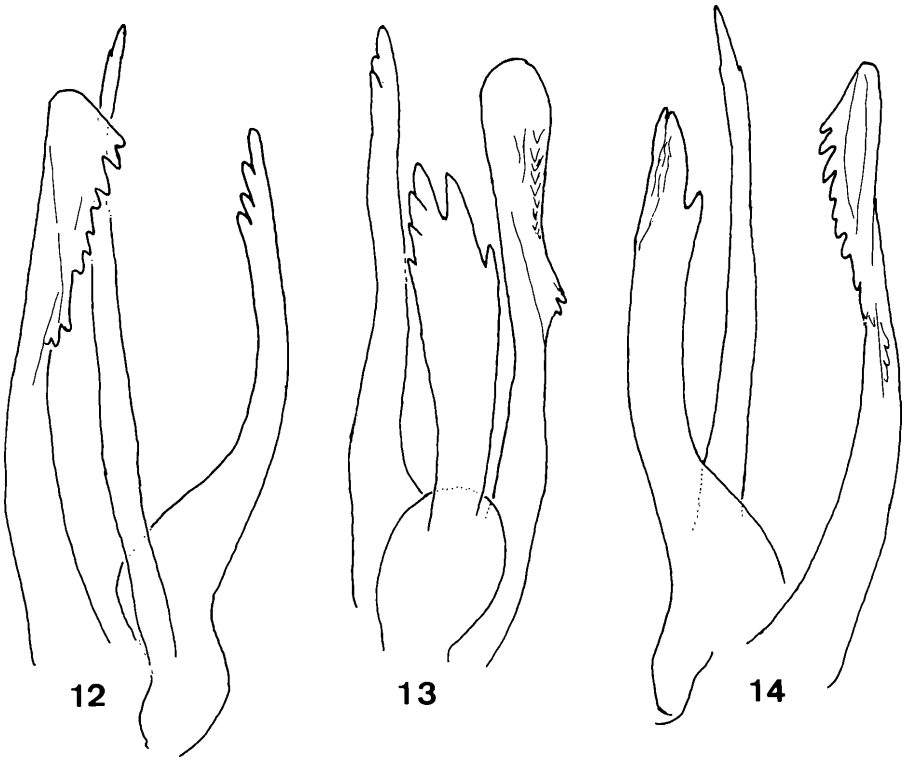
Derivatio nominis The species is dedicated to our friend José Ignacio LÓPEZ-COLÓN, who first has collected the species, as recognition of his friendship and as homage for his contributions to the knowledge of several families of Iberian Coleoptera.

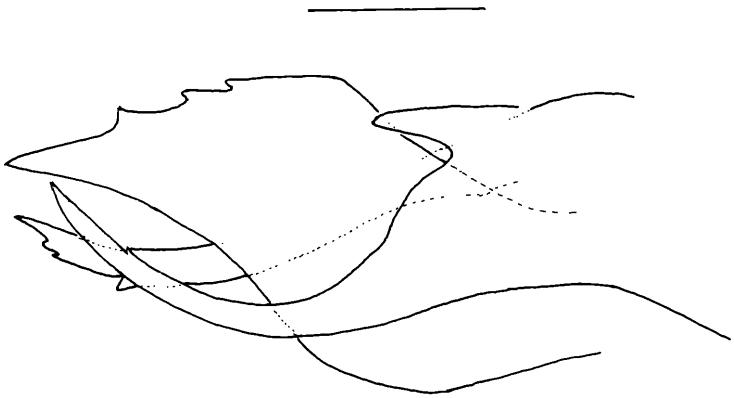
Discussion *H. lopezcoloni* sp. n. belongs to the *horvathi* group composed of species living in North Africa and Israel: *H. horvathi*, *H. lindbergi*, *H. hermione* and *H. hannothiauxi*. From *H. lindbergi*, *H. hermione* and *H. hannothiauxi* the new species can be easily distinguished by the absence of dark spots on the upper surface. From *H. horvathi* it can be distinguished by its smaller size. From the other species living in the Iberian Peninsula, *H. flavolimbata* and *H. stehliki* sp. n., *H. lopezcoloni* can be separated by its smaller size. The genital structures of *H. lopezcoloni* are clearly different from all the other species.

Material studied: Province of Madrid: Rivas-Vaciamadrid, Cerro del Telégrafo, 28.5.1993, male (holotype), 2 females (paratypes); 29.4.1994, female (allotype), 1 female (paratype), 22.5.1994, 1 male (paratype). On male specimens of *Ephedra fragilis fragilis* DESF.; all J. I.



Figs 3–11: *Hyoidea lopezcoloni* sp. n.; 3–6, right style in four different views; 7–11, left style in different views. (Scale line 0.1 mm)





Figs 12–15: Vesical appendages of *Hyoidea* sp.; 12–14, *Hyoidea lopezcoloni* sp. n. in three views; 15, *Hyoidea stehliki* sp. n. (Scale line 0.1 mm).

	Body		Antennae			
Sex	Length	Width	I	II	III	IV
♂♂	3.62–3.95	1.10–1.20	0.30–0.37	0.87–1.15	0.40–0.45	0.37
♀♀	3.62–4.50	1.15–1.40	0.30–0.37	0.80–1.15	0.45–0.57	0.32–0.37
	Head				Pronotum	
Sex	Width	Height	Synthlipsis	Width eye	Width	Length
♂♂	0.85–0.97	0.62–0.75	0.50–0.57	0.20–0.22	0.95–1.10	0.57–0.70
♀♀	0.90–1.07	0.70–0.80	0.52–0.67	0.20–0.22	1.07–1.22	0.65–0.75

Table 1: Measurements of *Hyoidea lopezcoloni* sp. n.

López-Colón leg., all in coll. I.E.S. Trassierra, Córdoba; Torres de la Alameda, 10.5.1997, 1 male, 3 females (paratypes) in coll. H. Günther, Ingelheim; same data 2 females (paratypes) in coll. I.E.S. Trassierra, Córdoba; 21.5.1997, 2 males, 2 females (paratypes) in coll. I.E.S. Trassierra, Córdoba, all Lucía Arnáiz y Pablo Bercedo leg.

Hyoidea stehliki sp. n. (figs 15–25, 28)

The species looks very similar to the other members of the genus and differs from them mainly in the structure of the vesica and in the proportions of some body parts (measurements see table 2). Body elongated, 5 to 6 mm long, with straight, nearly parallel margins, about 4 times as long as broad. Colour in general yellowish-grey or olive with black markings.

Diatone 1.0 to 1.2 mm, head 0.5 to 0.6 mm long. synthlipsis 0.55 to 0.65 mm, eyes 0.25 to 0.3 mm. Ocular index 2.03 to 2.48 in the males and 2.40 to 2.68 in the females. Vertex flat, basis distinctly carinated. Two black spots on the vertex, close to the eyes and 5 to 6 transversally situated and elongated stripes which form a horseshoe-like pattern open to the base of the antennae. Clypeus laterally broad black, a central longitudinal stripe extends from the base to the middle or sometimes to the top of the clypeus. Antennae black with short, light hairs, 3.4 to 3.7 mm long, diameter of the first segment larger than in the second, this larger as the third and the fourth.

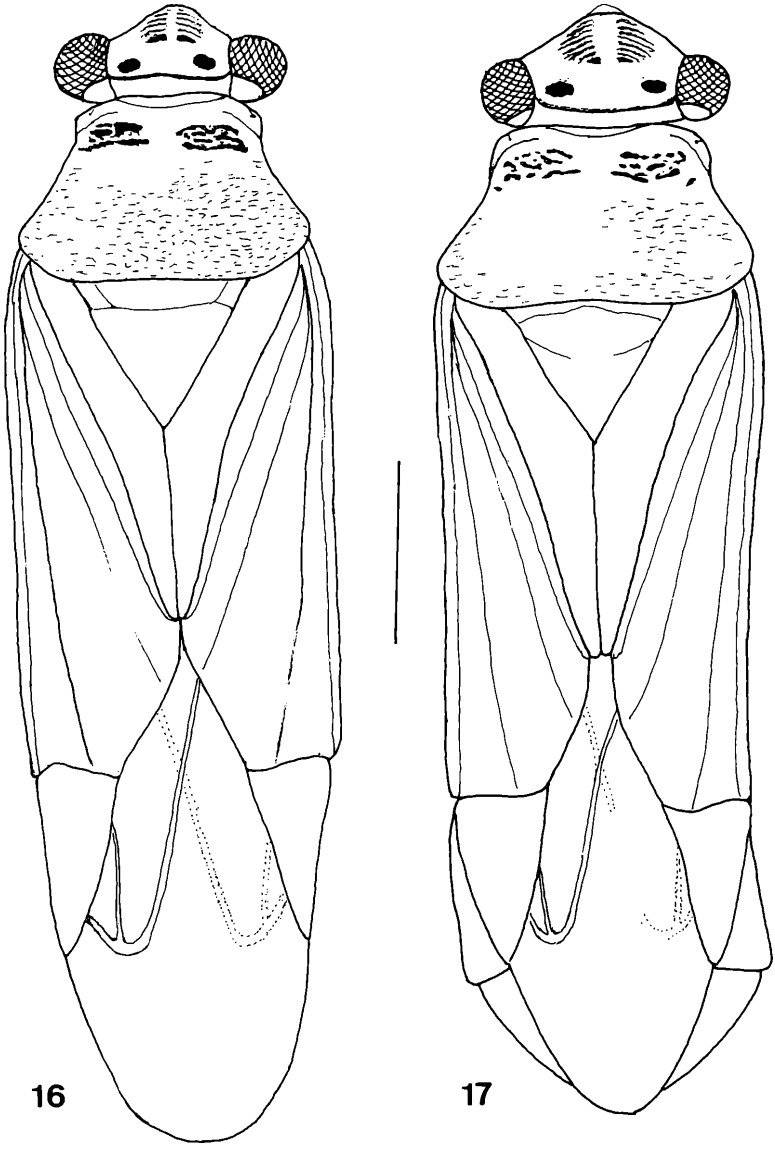
Pronotum yellowish-grey, anterior margin with a broad collar, reaching from one edge to the other, in front of it a smaller one, extending between the inner sides of the eyes.

Cally sharply limited, black and separated from each other.

Hemielytra long, yellowish-grey without any patterns, veins of the same colour as the wings. Membrane very long, overreaching the abdomen, darker than the corium with veins of the same colour. The legs dark-reddish brown, femora with 6 to 8 dark spots on the dorsal surface, tibia wear 5 to 7 fine, light spines ventrally and a row of minute spines dorsally. Tarsi black.

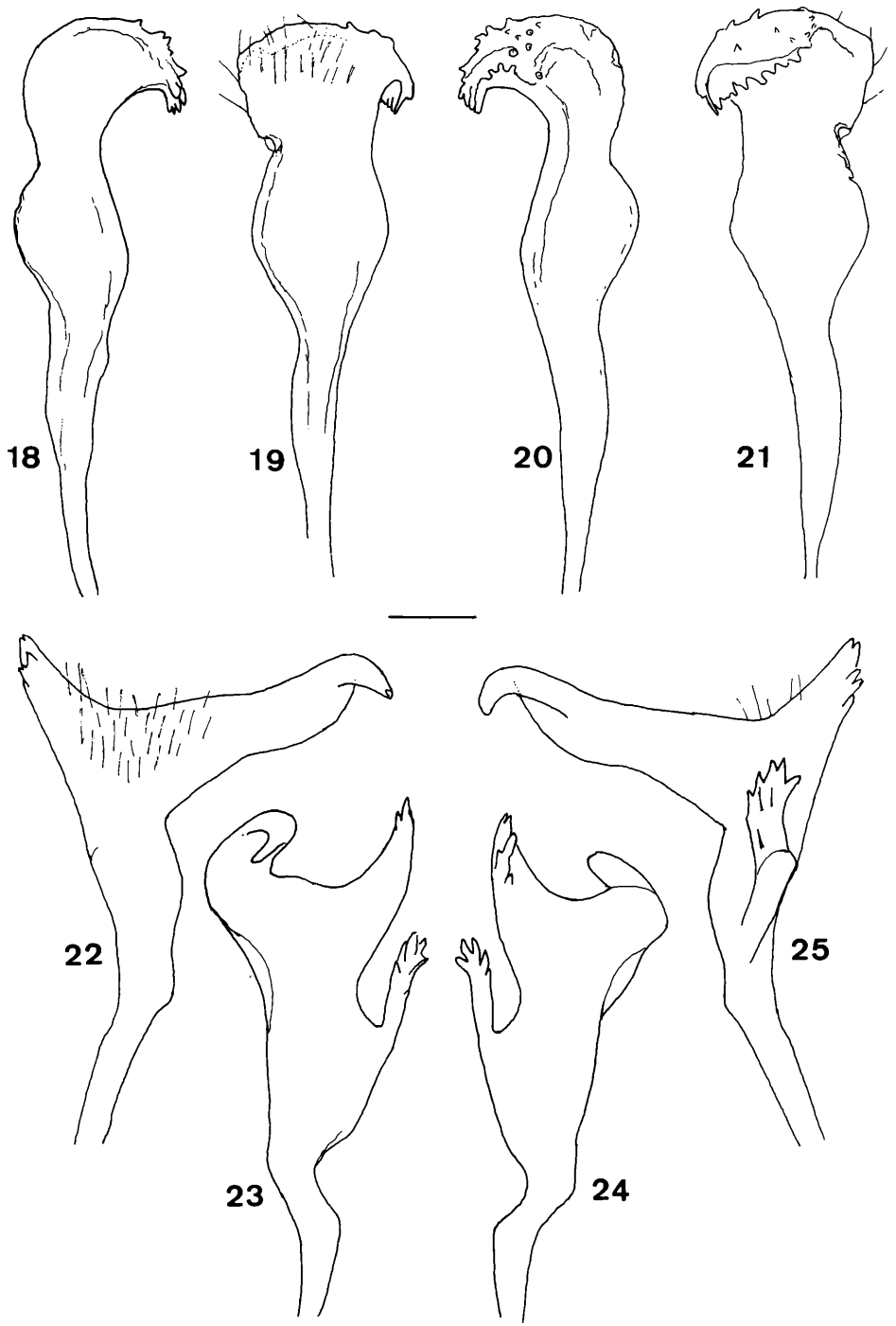
Venter yellowish, more or less of the same colour as the corium, thoracic pleurae yellowish, thoracal sternites black.

The rostrum exceeds the middle of the mesosternum without reaching the coxae.



Figs 16–17: *Hyoidea stehliki* sp. n.; 16, male; 17, female. (Scale line 1 mm)

The genital capsule is 1.1 mm wide and 0.7 mm long, with a large, triangular dent at the left border of the genital opening and another one, smaller and sharper, in caudal position (fig. 28). A similar small and sharp dent at the right border. The caudal border with two long processes. Right style (figs. 18 to 21) with the basis thickened in the middle and reduced again in the upper third, hypophysis dentated and recurved. Left style (figs. 22 to 25) with long hypophysis, ending in a hook. Upper process of the sensory lobe with 4 to 5 striking teeth, lower process long and small with 5 to 6 striking teeth, reaching the middle of the basis of the hypophysis. Vesica (fig. 15) with three appendages, one long and sharp, both sides poorly dentated, its basis broad with



Figs 18–25: *Hyoidea stehliki* sp. n.; 18–21, right style in four different views; 22–25, left style in four different views. (Scale line 0.1 mm)

	Body		Antennae			
Sex	Length	Width	I	II	III	IV
♂♂	5.10–5.50	1.47–1.75	0.50–0.55	1.65–1.70	0.62–0.75	0.27–0.40
♀♀	5.00–5.90	1.52–1.62	0.55–0.60	1.50–1.62	0.62–0.77	0.37–0.40

	Head				Pronotum	
Sex	Width	Height	Synthlipsis	Width eye	Width	Length
♂♂	1.00–1.10	0.70–0.77	0.55–0.62	0.25–0.27	1.37–1.50	0.82–0.90
♀♀	1.15–1.17	0.77–0.82	0.65–0.67	0.25–0.27	1.45–1.57	0.85–0.90

Table 2: Measurements of *Hyoidea stehliki* sp. n.

a sharp appendix. In the middle a very broad appendix, trapezoid-formed, with 6 to 7 sharp tooth. The third one long and small, S-shaped without teeth.

Derivatio nominis The species is dedicated to our friend Jaroslav STEHLÍK, Brno, who first introduced us into the knowledge of *Hyoidea notaticeps* in Slovakia.

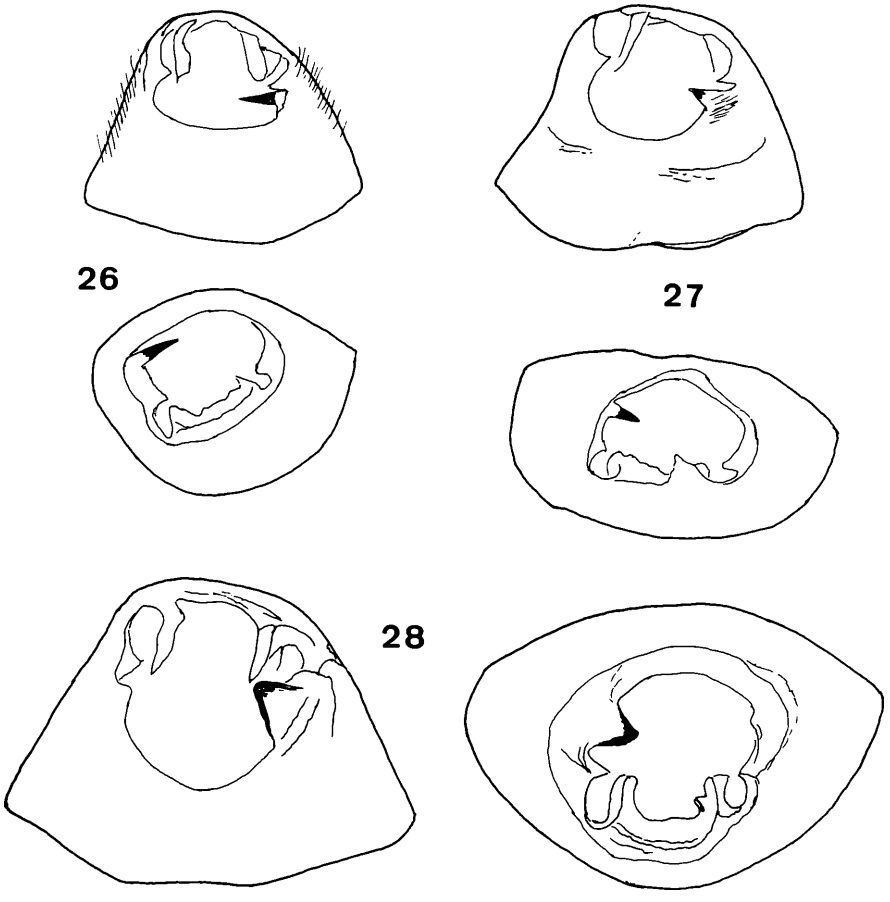
Discussion: *Hyoidea stehliki* is isolated from the other species within the genus *Hyoidea* by its genital structures, mainly by the form of the spiculum at the side of the genital opening forming a triangle whereas it is sharp and narrow in all the other species studied.
The middle appendage of the vesica is striking different from those of all the other species. From the two other Spanish species it is easily to distinguish: *H. lopezcoloni* is smaller, the exocorium of *H. flavolimbata* has pale margins.

Material studied: Province of Almería, Bédar, 11.5.1989, male (holotype), female (allotype), coll. H. GÜNTHER, Ingelheim; Bédar, 7.5.1988, 2 females (paratypes), P. SPRICK leg., coll. A. MELBER, Hannover; Bédar, 11.5.1989, 4 males, 4 females (paratypes), coll. I.E.S. Trassierra, Córdoba; 11.5.1989, 4 males, 1 female (paratypes), coll. H. GÜNTHER, Ingelheim; Bédar, 15.5.1996, 5 males (paratypes), coll. H. GÜNTHER, Ingelheim; Bédar, 21.4.2000, 1 male (paratype), coll. H. GÜNTHER, Ingelheim. All specimens were collected on *Ephedra fragilis* near Bédar in the Sierra de Bédar, provincia de Almería, 400 to 600 m in height.
Holotype and paratypes are planned to deposite in a Museum of Natural History.

Hyoidea lindbergi HOBERLANDT, 1963

The pygophore of this species is figured for the first time (fig. 27)

Material studied Morocco, Atlas Mai, Reraia, 29.5-15.6.26, 6 females, LINDBERG leg. (as *H. horvathi*) (Museum Helsinki); same data label, 1 male and 1 female, paratypes (Museum Prague).



Figs 26–28: Pygophores of *Hyoidea* sp. 26, *Hyoidea lopezcoloni* sp. n.; above, dorsal view; down, caudal view. 27, *Hyoidea lindbergi* HOB.; same structures. 28, *Hyoidea stehliki* sp. n.; left, dorsal view and right, caudal view. (Scale line 0.5 mm)

Hyoidea flavolimbata RIBES & RIBES (in press)

One specimen of this species that will be included in the type series, has been collected in Aranjuez, Madrid (Toledo on the label), 4.5.1990, U. KOSCHWITZ leg. (in coll. GÜNTHER).

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