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Four new species and a new genus of Delphacidae from Southern Europe and Egypt (Homoptera, Fulgoroidea)

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Four new species of Delphacidae from Southern Europe are described and illustrated: *Eurysa jorcasa* sp.n. and *Metropis obscurus* sp.n. from Spain; *Eurysa etnicola* sp.n. and *Eurysa meridiana* sp.n. from Italy. *Metropis tridentatus* LOGVINENKO from Azerbaydzhan is transferred to *Eurysa* FIEBER. A new genus, *Luxorianella* gen.n., is established for *Calligypona isis* LINNAUORI from Egypt. The phylogenetic position of the new taxa is briefly discussed.

Keywords: Homoptera, Delphacidae, *Eurysa*, *Metropis*, *Luxorianella*, taxonomy, zoogeography, Italy, Spain, Egypt.

INTRODUCTION

With more than 200 described species, the planthopper family Delphacidae is well represented in the Western Palaearctic (e.g., NAST, 1972, 1982). The southern European areas, however, can still be regarded as insufficiently investigated regarding this group. Recent studies on delphacids in southern Europe have mainly been focused on the faunas of Greece (e.g., ASCHE & HOCH, 1982; ASCHE & REMANE, 1982; DROSOPOULOS, 1982; DROSOPOULOS *et al.*, 1983), and France (e.g., REMANE & DELLA GIUSTINA, 1992, 1993; DELLA GIUSTINA & REMANE, 1992a, 1992b). For other countries of southern Europe and northern Africa, respectively, comparatively little is known about the composition of their delphacid fauna. In the course of field work in Italy and Spain, several new delphacid species have been collected, four of which are described below.

Depositories of material: AH : M. ASCHE and H. HOCH, Marburg, Germany, private collection. – AMNH: American Museum of Natural History, New York, U.S.A. – BMNH: The Natural History Museum, London, UK. – BPBM: Bishop Museum, Honolulu, Hawaii, USA. – DR : S. DROSOPOULOS, Athens, Greece, private collection. – DU : V. D'URSO, Catania, Sicily, Italy, private collection. – MNHN: Muséum National d'Histoire Naturelle, Paris, France. – NHMB: Naturhistorisches Museum Basel, Switzerland. – NMW : National Museum Wales, Cardiff, UK. – ZMH : Zoologisches Museum Hamburg, Germany.

Eurysa FIEBER

Eurysa FIEBER, 1866: 520. Type species: *Delphax lineata* PFERRIS, 1857 (type locality in France), by subsequent designation of OSHANIN, 1912.

Remarks: Currently, the genus *Eurysa* is rather broadly interpreted. It is widely distributed in the Holarctic and Africa and includes small to medium-sized species with an anteriorly broadly rounded head and a cultrate, solid post-tibial spur devoid of or with minute teeth. The species are predominantly brachypterous and show sexual dimorphism in bodily pigmentation. Morphologically, this genus is rather heterogeneous, especially in the configuration of the male genital structures. Recent work has focused on selected European species groups within the genus: the Canario-Madeiran "*Eurysa*" were excluded from the genus and assigned to the genus *Makarorysa* REMANE & ASCHE (REMANE & ASCHE, 1986a); several species were added to the genus as members of the probably monophyletic *E. lineata* group of species (REMANE & ASCHE, 1983, 1986b; ASCHE *et al.*, 1983a; DROSOPOULOS & ASCHE, 1984). FENNAH (1988) established the genera *LeptoEurysa* and *ScotoEurysa* for part of the Afrotropical *Eurysa* species. Presently, 19 European species, 4 Nearctic species, 1 Neotropical species, and as yet 4 Afrotropical species are assigned to *Eurysa*. The differences in the morphological display of the taxa combined here, provide strong indications of several independent evolutionary lines. A phylogenetically based revision of *Eurysa* as a whole is necessary, but probably only possible in the framework of an analysis of the other morphologically similar "stiromine" delphacids.

Until a phylogenetic analysis of the genus *Eurysa* becomes available, however, 4 more species are tentatively placed here.

Eurysa tridentata (LOGVINENKO) comb. nov.

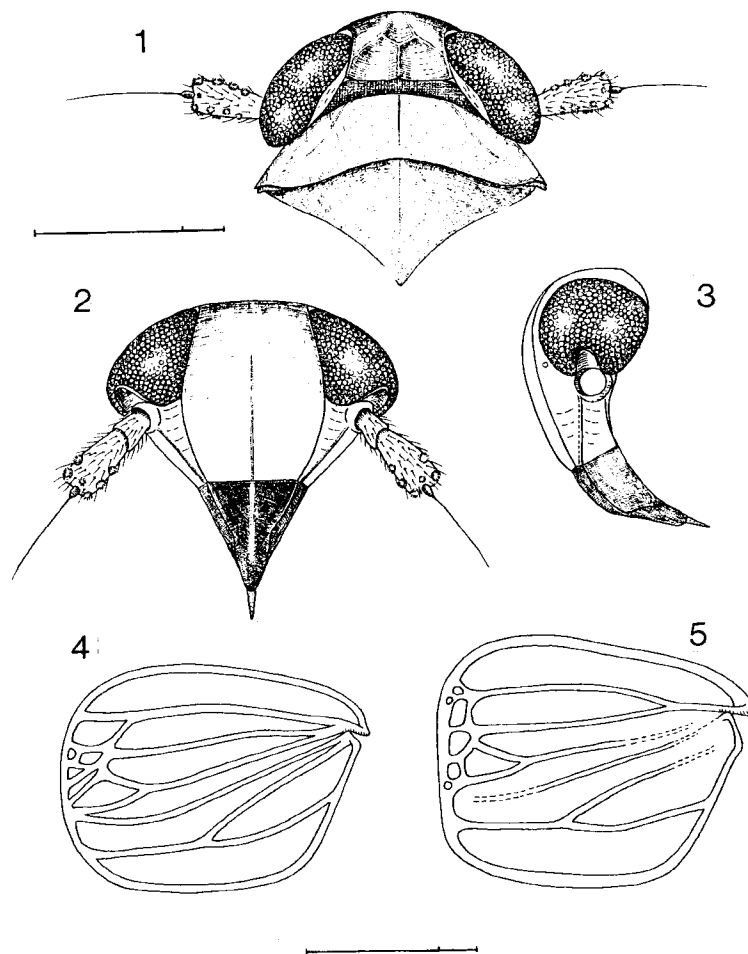
Metropis tridentatus LOGVINENKO, 1970: 626

Remarks: According to the illustrations in LOGVINENKO (1970), *Metropis tridentatus* LOGVINENKO from Azerbaydzhan belongs to the morphological group of *E. brunnea* MELICHAR (MELICHAR, 1896).

Eurysa etnicola sp.n. (Figs 1-12)

Small, slender species, brachypterous form with sexually dimorphic coloration: males with body and tegmina shiny black-brown, head and pronotum ochraceous to dirty light brown, post- and anteclypeus dark brown, legs and antennae stramineous to diffusely yellow; females uniformly stramineous to pale yellow, tergites 5-8 laterally each with a distinct dark brown patch.

Head (Figs 1-3): Head including compound eyes about 2.5 times wider than vertex at base; surface of vertex and frons mostly smooth. Vertex short and wide, 1.6 times wider at base than long in middle line, broadly rounding onto frons; carinae feebly developed, basal compartments shallowly concave, separated by a fine median carina; anterior compartment indistinct, obsolete to frons. Frons strongly vaulted, slightly projected in front of the compound eyes; 1.3 times higher than its maximum width (widest at lower level of compound eyes); about 1.6 times higher than post- and anteclypeus together; lateral margins of frons sharp-edged, convex; median carina very fine (less developed in females), vanishing to vertex. Postclypeus with lateral carinae (limiting the lamina maxillaria) strongly ridged; area gently ascending to distinct median carina. Anteclypeus compressed, median carina indistinct. Rostrum rather short, slightly exceeding the middle coxae. Genae with oblique carina sharp-edged. Antennal segments short, subcylindrical; second segment 1.5-1.6 times longer than first; number and arrangement of antennal sensory fields (pla-



Figs 1-5. - *Eurysa etnicola* sp.n., paratype ♂. 1: head and thorax, dorsal aspect; 2: head, frontal aspect; 3: head, left lateral aspect; 4: left tegmen, paratype ♂; 5: left tegmen, paratype ♀. Scales: 0.5 mm.

culae): 16-7 (see ASCHE, 1985). Compound eyes large, anteriorly almost reaching the lateral margins of frons; ocelli rudimentary or absent.

Thorax (Figs 1, 4-5): Pronotum only little wider than the head including compound eyes, tricarinate; in middle line about as long as vertex; carinae weakly developed; lateral carinae diverging, not reaching the posterior margin; median carina very feeble or absent; surface of pronotum dorsally somewhat wrinkled. Mesonotum medially twice the length of the pronotum, carinae absent, surface mainly

smooth. Tegulae rudimentary. Tegmina strongly shortened, in both sexes reaching well to the middle of the 5th abdominal tergite; in male distally slightly rounded, in females subtruncate; venation strongly reduced. Wings vestigial. Hind legs: tibia 1.2 times longer than the tarsal segments together; first tarsal segment about 2.4 times longer than second and third segment together, and 2.2 times longer than the post-tibial spur; distal spine-configuration of the tarsal segments: first with 7 spines in a curved row, second with a stronger tooth on each side and 2-3 rather weak median teeth. Post-tibial spur solid, triangular in cross-section, inner margin devoid of teeth. Abdominal tergites in middle line distinctly ridged.

Total length: Males 1.8-1.9 mm, Females 2.4-2.5 mm.

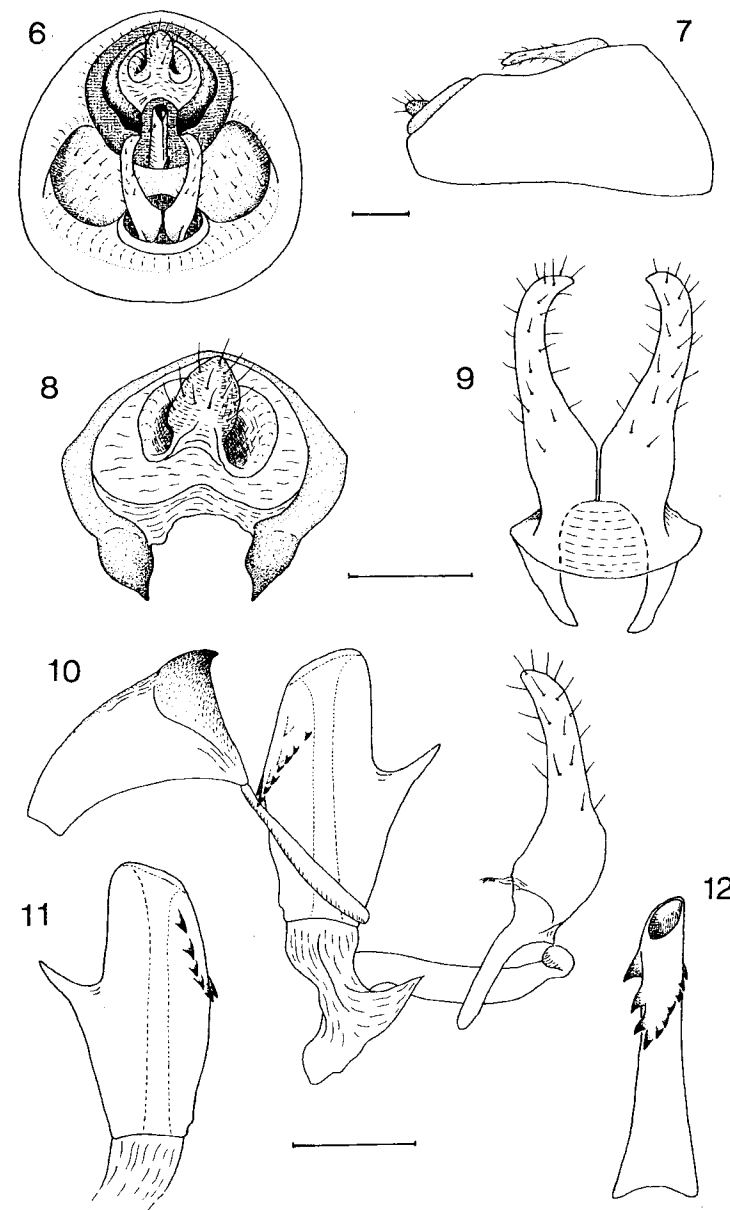
Male genitalia (Figs 6-12): Genital segment in caudal aspect almost circular, about as high as wide, with caudal margin at level of the sclerotized diaphragm somewhat angulately extruded; in lateral aspect irregularly trapezoidal, ventrally about 4 times longer than dorsally, laterodorsal angles slightly produced; in ventral aspect with caudal margin shallowly emarginated; diaphragm strongly sclerotized, covering about the lower half of the caudal side of the genital segment, slightly sunk cephalad, dorsal margin almost semicircularly excavated; opening for the parameres flat ovate. Anal segment ring-like, short, ventral side concave and membranous; lateroventral margins projected medioventrad, forming a short claw-like process on each side. Aedeagus stout, compressed tubular, at middle of its ventral side with a single spinose process directed ventrocaudad; subapically from the dorsal to the right side an ascending row of 4-5 short teeth; subapically from the dorsal to the left side an ascending row of 5-6 short teeth, both rows together forming an acute angle on the dorsal side; phallosome apically, slightly exposed dorsad; suspensorium ring-like, embracing the base of the aedeagus at the ventral side; connective almost straight.

Female genitalia: Ovipositor rather short, not reaching the distal tips of the ninth tergite. Valvifers VIII. slender and simple, without basal projections. Anal style very short, concolorous, hardly exceeding the distal margin of the anal segment.

Type material: Holotype ♂, brachypterous, Italy, Sicily, Mt. Etna, supra Linguaglossa, nr. Rifugio Citelli, Pinco di Linguaglossa, ca. 1500 m, on grass under pine trees, 15.V.1986, M. ASCHE & H. HOCH; in ZMH. Paratypes: 24 ♂♂, 21 ♀♀, brachypterous, same data as holotype; 60 ♂♂, 37 ♀♀, brachypterous, 20.V.1986, same locality as holotype, M. ASCHE, H. HOCH, S. DROSOPoulos & V. D'URSO; in AH, BMNH, BPBM, DR, DU, MNHN, NHMB, NMW, ZMH.

Remarks: By the configuration of the male genital structures, *E. etnicola* is apparently not a close relative of *Euryrsa* s.str., e.g., of the type species of the genus, *E. lineata*. In the shape of the aedeagus it shows a certain similarity with *E. flavo-brunnea* DLABOLA (DLABOLA, 1956) by sharing a ventrocaudad directed process on the ventral side of its shaft; however, the special quality of this process and striking differences in other structures of the aedeagus in combination with other genital characters may suggest convergence. Thus, *E. etnicola* remains isolated within this genus.

So far, *E. etnicola* is geographically confined to the Mt. Etna in Sicily, where it occurs syntopically and synchronously with *Euryrsa lineata* and *E. meridiana* sp.n. (see below). It was collected by sucking the individuals from the lower parts of stems of a yet unknown grass species (*Festuca* sp.?) growing under pine trees after spreading the tussocks.



Figs 6-12. — *Euryrsa etnicola* sp.n., paratype ♂. Male genitalia; 6: genital segment, caudal aspect; 7: same, left lateral aspect; 8: anal segment, caudal aspect; 9: parameres, caudal aspect; 10: male genitalia, genital segment removed, left lateral aspect; 11: aedeagus, right lateral aspect; 12: aedeagus, dorsal aspect. Scales: 0.1 mm.

Eurysa jorcasa sp.n. (Figs 13-19, 21, 24, 26-28)

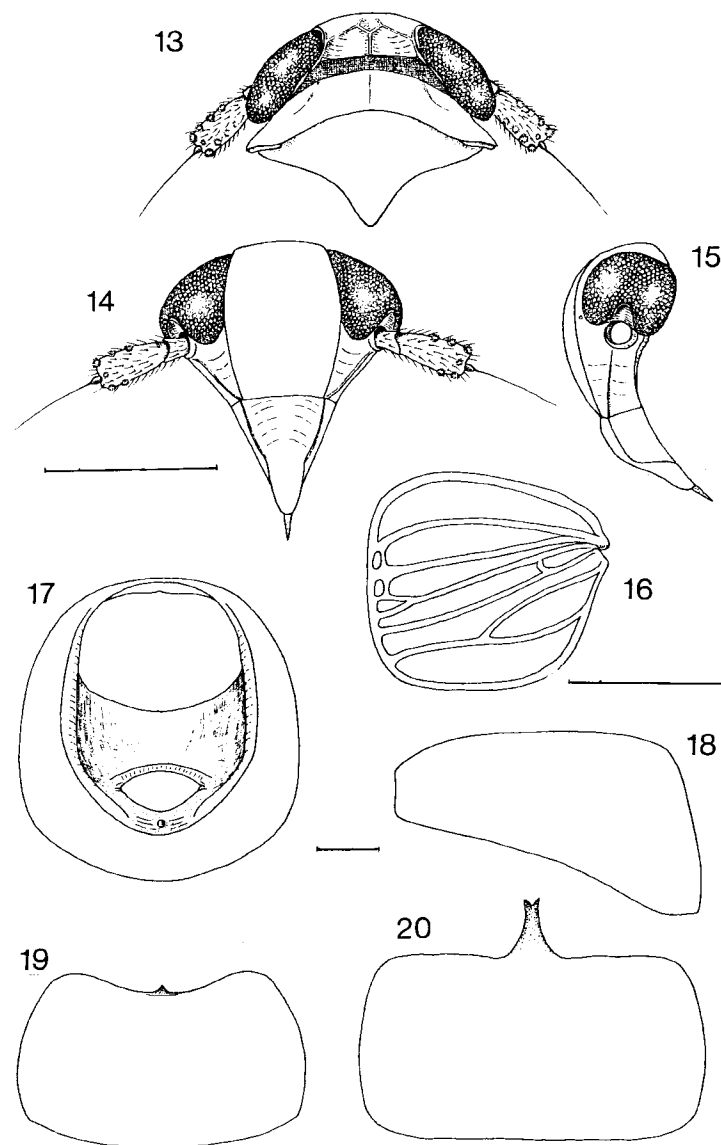
Male brachypterous: small species with strongly rounded frons, externally resembling *E. brunnea*. Body generally shiny brown; frons, pro- and mesonotum chestnut-brown; clypeus blackish brown; abdomen including genital segment as well as tegmina dark brown; legs diffusely ochraceous to dirty brown.

Head (Figs 13-15): Head including compound eyes 2.3 times wider than the vertex at base. Vertex short and wide, about twice as wide at base than long in middle line; carinae on vertex faint; basal compartments of vertex rather large, separated by a fine median carina; anterior compartment vanishing, area broadly rounding onto frons. Frons slightly higher than wide (1.2:1), widest at level of antennal bases, about 1.3 times higher than post- and anteclypeus together; surface smooth, vaulted, without median carina; lateral carinae convex, sharp-edged. Postclypeus with lateral margins ridged, surface convex, median carina absent; anteclypeus compressed, medially slightly ridged. Rostrum attaining but not surpassing hind trochanters. Lateral oblique carina of genae distinct, lamina maxillaria well defined. Antennal segments short, subcylindrical; second segment 1.7 times longer than first; number and arrangement of sensory fields: 16-7. Compound eyes well developed, anteriorly almost attaining the lateral margins of frons; ocelli absent.

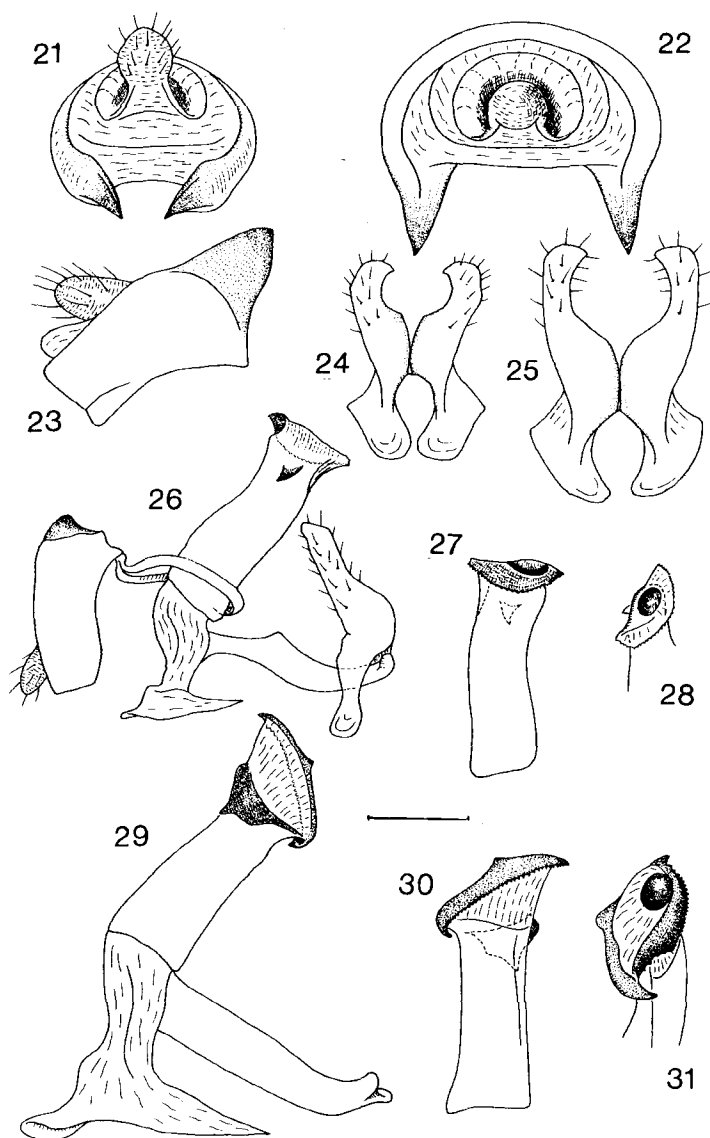
Thorax (Figs 13, 16): Pronotum with surface smooth and convex, median carina absent, lateral carinae obsolete; in middle line about 1.5 times shorter than vertex. Mesonotum vaulted with smooth surface; carinae absent; medially about 3.2 times longer than pronotum. Tegulae vestigial. Tegmina shortened, distally subtruncate, just attaining the hind margin of the fifth abdominal tergite; venation strongly reduced; wings vestigial, forming a very small lobe. Abdominal tergites medially with a fine ridge. Hind legs: tibia about 1.5 times longer than the tarsi together; first tarsal segment 1.3 times longer than second and third segment together, and 1.5 times longer than the post-tibial spur; distally armed with 6 spines which nearly form a row; second tarsal segment distally with 4 spines in a row. Post-tibial spur short, solid, subtriangular in cross section, inner surface slightly concave, inner margin smooth without teeth.

Total length: 1.8 mm.

Male genitalia (Figs 17-19, 21, 24, 26-28): Genital segment in caudal aspect high ovate, about 1.55 times higher than wide; in lateral aspect flat trapezoidal, ventrally about 3.7 times longer than dorsally; laterodorsal angles smoothly rounded, not projected caudad; medioventrally with a short triangular spine; margins to caudal diaphragm smooth; opening for the parameres shaped like a flat mushroom; diaphragm above the paramere-opening sclerotized and slightly sunk cephalad against the caudal margins of the genital segment; diaphragm medially with a very fine longitudinal ridge; sclerotized part of diaphragm covering the basal half of the caudal side of the genital segment. Anal segment short, ring-like; medioventral side concave, membranous; laterocaudal angles on each side projected into a short, blunt, arm-like process which is directed medioventrad. Parameres short and slender, somewhat stout, in repose directed dorsad reaching the upper level of the sclerotized diaphragm; distally slightly converging; at inner side of their apex with a short, blunt edge. Aedeagus tubular but strongly compressed; apically on the right side furnished with a turned down collar-like, finely serrate margin; subapically on the left side with a small tooth; phallosome apically, slightly exposed to the right side; suspensorium ring-like, completely surrounding the ventral base of the aedeagus; connective almost straight, strongly laterally compressed.



Figs 13-19. - *Eurysa jorcasa* sp.n., holotype ♂. - Fig. 20. *Eurysa brunnea* MELICHAR, specimen from Kombach, Hessen, Germany. 13: head and thorax, dorsal aspect; 14: head, frontal aspect; 15: head, left lateral aspect; 16: left tegmen; 17-20: male genitalia; 17: genital segment, caudal aspect; 18: same, left lateral aspect; 19: same, ventral aspect; 20: same of *E. brunnea*, ventral aspect. Scales: Figs 13-16: 0.5 mm; Figs 17-20: 0.1 mm.



Figs 21, 24, 26-28. — *Eurysa jorcasa* sp.n., holotype ♂. — Figs 22, 23, 25, 29-31. *Eurysa brunnea* MELICHAR, specimen from Kombach, Hessen, Germany. Male genitalia: 21: anal segment, caudal aspect; 22: same of *E. brunnea*, caudal aspect; 23: same, left lateral aspect; 24: parameres, ventrocaudal aspect; 25: same of *E. brunnea*, ventrocaudal aspect; 26: male genitalia, genital segment removed, left lateral aspect; 27: aedeagus, right lateral aspect; 28: tip of aedeagus, ventrocaudal aspect; 29: aedeagus with connective of *E. brunnea*, left lateral aspect; 30: same, right lateral aspect; 31: same, tip of aedeagus, ventrocaudal aspect. Scale: 0.1 mm.

Female: unknown.

Type material: Holotype ♂, brachypterous, NE Spain, Prov. Teruel, ca. 2 km N Jorcás, ca. 1250 m, 31.V.1979, M. ASCHE & H. HOCH; in ZMH.

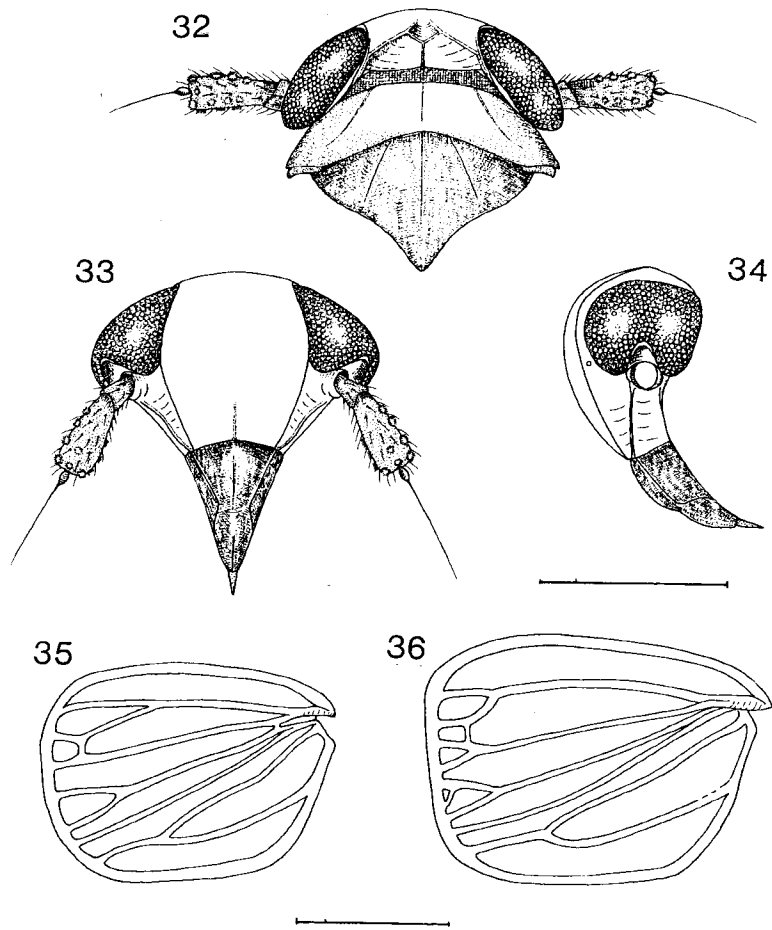
Remarks: Within *Eurysa*, *E. jorcasa* resembles the Central and West European species *E. brunnea* (for comparison here illustrated: Figs 20, 22, 23, 25, 29-31) in general appearance, although it is smaller, and in the structures of the male genitalia, especially the aedeagus. It differs from this species mainly by displaying a much shorter medioventral process on the caudal margin of the genital segment, by the stouter parameres, by the shorter and blunter ventrolateral projections of the anal segment which are directed medioventrad instead of straight ventrad, and especially by the configuration of the crown-like tip and the left lateral subapical spine of the aedeagus. Since there is no evidence of any kind of teratological influence which might have caused alterations of the genital structures, this single specimen is here regarded as representative of a "good" species. *E. jorcasa* may represent the geographic vicariant of *E. brunnea* in the Iberian Peninsula. The *E. brunnea* morphogroup now contains the 3 species *E. brunnea*, *E. jorcasa*, and *E. tridentata*. *E. jorcasa* was collected by sweeping grasses. Its host plant(s) and ecology remain unknown.

Eurysa meridiana sp.n. (Figs 32-45)

Small, stout species, in size and proportions resembling *E. etnicola* sp.n., but more robust. Coloration of brachypterous form: males with body and tegmina black brown to black, pro- and mesonotum dorsally testaceous, sides of pronotum blackish; vertex and upper frons ochraceous to brown, frons constantly darker to base; genae, post- and anteclypeus, and antennae dark brown; legs diffusely brown; females with body generally ochraceous to medium brown, frons darker to base; post- and anteclypeus black brown; abdominal tergites medium brown with lateral portions black brown; tegmina suffusely milky, opaque, veins stramineous to pale yellow; legs stramineous, third tarsal segments dark brown.

Head (Figs 32-34): Head including compound eyes 2.2-2.4 times wider than vertex at base. Vertex 2.3-2.4 times wider at base than long in middle line, broadly rounding onto frons; carinae very faint, basal compartments visible, shallowly concave; anterior compartment vanishing to frons. Frons strongly vaulted, surface smooth, almost as high as wide (1.1:1), widest at lower level of compound eyes, about 1.25 times higher than post- and anteclypeus together; lateral carinae convex, sharp-edged, median carina absent. Postclypeus vaulted, lateral carinae ridged, median carina only present in lower half, ridged, continuing onto anteclypeus. Oblique carina of genae sharp-edged. Antennal segments subcylindrical, second segment about 2.3 times longer than first; number and arrangement of sensory fields: 16-7. Compound eyes large, distance between their anterior margin and the latero-frontal carinae very short. Rostrum not exceeding the middle coxae.

Thorax (Figs 32, 35-36): Pronotum in proportions and carination resembling *E. etnicola*, median carina mostly visible. Mesonotum medially about 2.6 times longer than pronotum, very faintly tricarinate (in some specimens carinae obsolete). Tegulae rudimentary. Tegmina in both sexes strongly shortened, venation reduced: in males coreaceous, reaching to distal margin of the fifth abdominal tergite, distally slightly rounded; in females semihyaline, reaching to middle of the sixth abdominal tergite, distally almost truncate. Hind legs: tibia about 1.4 times longer than tarsal segments together; first tarsal segment 1.4 times longer than second and third together, 1.5 times longer than the post-tibial spur, distally with a row of 7 teeth;

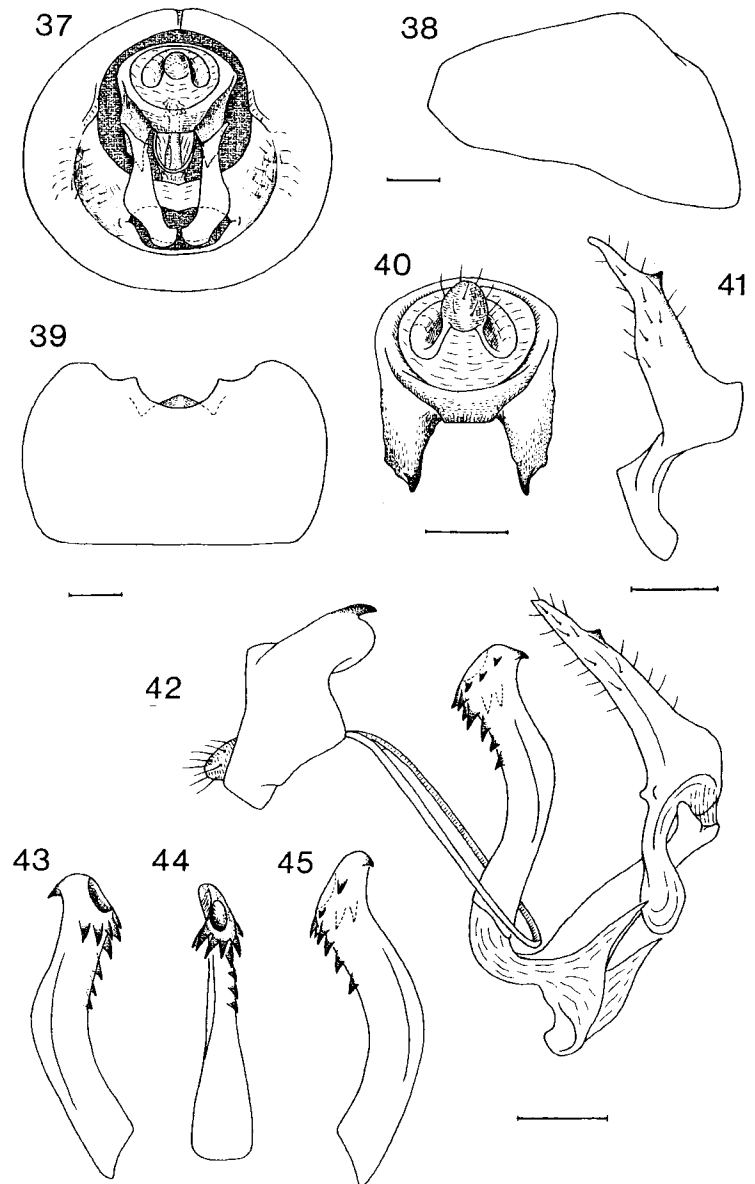


Figs 32-36. - *Eurysa meridiana* sp.n., paratype ♂ from Calabria. 32: head and thorax, dorsal aspect; 33: head, frontal aspect; 34: head, left lateral aspect; 35: left tegmen, paratype ♂; 36: left tegmen, paratype ♀. Scales: 0.5 mm.

second tarsal segment distally with 2 small central teeth flanked on each side by a stronger tooth. Post-tibial spur solid, triangular in cross section, inner margin devoid of teeth except for a terminal tooth, subapically below the terminal tooth a short edge.

Total length: Males 1.7-1.9 mm, Females 2.3-2.5 m.

Male genitalia (Figs 37-45): Genital segment in caudal aspect circular to flat ovate, slightly wider than high, caudal margins broadly rounded; in lateral aspect trapezoidal with laterodorsal angles slightly produced, ventrally about 4.1 times lon-



Figs 37-45. - *Eurysa meridiana* sp.n., paratype ♂ from Calabria. Male genitalia: 37: genital segment, caudal aspect; 38: same, left lateral aspect; 39: same, ventral aspect; 40: anal segment, ventrocaudal aspect; 41: parameres: ventrocaudal aspect; 42: male genitalia, genital segment removed, left lateral aspect; 43: aedeagus, right lateral aspect; 44: same, dorsal aspect; 45: aedeagus, paratype ♂ from Sicily, left lateral aspect. Scales: 0.1 mm.

ger than dorsally; caudal margin medioventrally quartercircularly emarginated with pointed edges; diaphragm sclerotized, covering the ventral half of the caudal side of the genital segment, against the caudal margins only little sunk cephalad, dorsal margin transverse, almost straight, central diaphragm dorsad of the parameres-opening slightly triangularly projected caudad; opening for parameres large, subovate. Anal segment short, ventrocaudally closed by a sclerotized bridge, ventrocaudal margins projected ventrad, on each side forming a strong arm-like process with a distal claw, both processes slightly diverging. Parameres rather long, reaching dorsad well to the level of the processes of the anal segment, distally diverging and slightly tapering, at base a well developed edge directed medioventrad, subapically on the inner margin a short tooth or an acute edge. Aedeagus tubular, slightly compressed, in lateral view slightly S-shaped, subapically on the left side a group of 2-4 teeth, subapically from the right side onto the dorsal side a crown of 3-5 strong teeth, on the dorsal side basad of this crown a longitudinal row of 3-4 teeth; phallosome apically, slightly exposed to the right dorsal side. Suspensorium forming long bridle-like arms which are attached to the ventrolateral base of the aedeagus. Connective straight, compressed.

Female genitalia: Ovipositor short, not exceeding the caudal tips of tergite IX. Valvifers VIII relatively broad, band-like. Anal style very short, black, fully rejected into the genital segment.

Type material: Holotype ♂, brachypterous, Italy, Calabria, Sila Mts., nr. Lorica, ca. 1300 m, grass under pine forest, 21.V.1986, M. ASCHE & H. HOCH; in ZMH. Paratypes: 23 ♂♂, 76 ♀♀, brachypterous, same data as holotype, M. ASCHE, H. HOCH & S. DROSOPOULOS; in AH, BMNH, BPBM, DR, MNHN, NHMB, NMW, ZMH. 3 ♂♂, 3 ♀♀, brachypterous, Sicily, Mt. Etna, supra Linguaglossa, nr. Rifugio Citelli, ca. 1500 m, on grass under pine trees, 15.V.1986, M. ASCHE & H. HOCH; in AH.

Remarks: Within *Eurysa*, *E. meridiana* is rather isolated, especially by the configuration of the male genital structures. The shape of the ventrolateral processes of the anal segment, the elongate arm-like suspensorium, and – to a certain extent – the parameres resemble those of the *E. forficula* (HORVATH) group of species within the *E. lineata* group (see REMANE & ASCHE, 1983). The aedeagus, however, is quite different; thus the similarities may be due to convergence.

In Calabria, *E. meridiana* occurs syntopically and synchronously with *E. lineata* and *Metropis latinus* LINNAUVUORI, 1959, in Sicily with *E. lineata* and *E. emicola*. In Calabria, it was collected by sweeping an unknown low growing grass species (*Festuca* sp.?) in an open pine forest; in Sicily it could be collected in tussocks of a yet unknown grass (*Festuca* sp.?) under pine trees.

Luxorianella n.gen.

Very small but robust brownish delphacids, externally resembling miniature *Eurysa* or *Iubsoda* NAST, 1975, species; only the brachypterous form of a single species known so far. Head including compound eyes about 2.7 times wider than vertex at base, and slightly wider than the pronotum. Carination generally faint. Vertex slightly wider at base than long in middle line, lateral margins almost parallel, anteriorly strongly rounded onto frons, carinae obsolete, basal compartments of vertex large, anterior compartment small, ill defined. Frons with surface smooth, slightly higher than wide, widest at lower level of the compound eyes, lateral carinae convex, median carina absent. Postclypeus rather small, vaulted, median carina

obsolete or absent; anteclypeus compressed, medially slightly ridged. Oblique carina of genae distinct. Antennal segments subcylindrical, second segment about 2.4 times longer than first, number and arrangement of sensory fields: 16-7. Compound eyes large, anteriorly almost reaching the laterofrontal margins; ocelli indistinct. Rostrum short, attaining the middle coxae. Pronotum tricarinate, medially about as long as the vertex, hind margin shallowly concave. Mesonotum short, medially about 1.7 times longer than the pronotum. Tegulae rudimentary. Tegmina strongly shortened, not exceeding the fifth abdominal tergite, apically truncate; wings vestigial. Hind legs: tibia slightly longer than tarsi (1.2:1), laterally with 2, distally with 5 (2+3) spines; first tarsal segment about 1.3 times longer than second and third tarsal segment together, and about 1.7 times longer than the post-tibial spur; first tarsal segment distally with 7 (2+5) spines, second tarsal segment distally with 4 spines in a row. Post-tibial spur subtriangular in cross section, inner margin with numerous small teeth. Abdominal tergites ridged in middle line; laterotergites well developed, almost rectangular.

Male genitalia: Genital segment in caudal aspect flat ovate to circular, nearly as high as its maximum width; in lateral aspect trapezoidal, its caudal margin smooth without conspicuous projections, laterodorsal angles smooth; in ventral aspect ventrocaudal margin slightly excavated; caudal margin of genital segment ridged throughout, not broadly rounded; diaphragm extending in the lower half of the genital segment, conspicuously sunk cephalad against the caudal margins; at the lower angles of the parameres-opening on each side arising a spinose (in type species bifurcate) protuberance. Anal segment short, ring-like, ventrally membranous, on each ventrolateral margin a spinose process. Parameres short, with dilated distal part. Aedeagus short, compressed, apically bilobate and pointed, subapically on both sides with a spinose process; phallosome subapically on the ventral side; suspensorium y-shaped, the tongue of the y connecting with the dorsal base of the aedeagus; connective short, slightly curved.

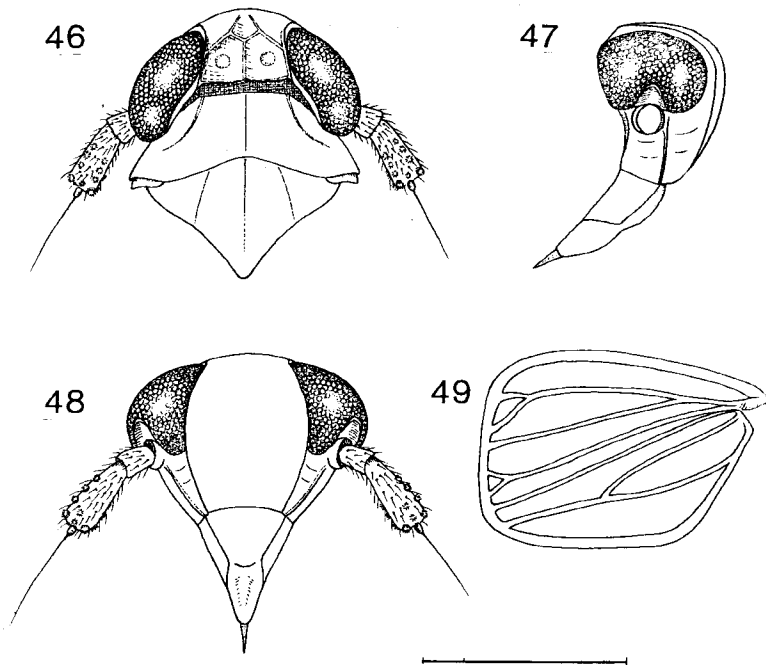
Type species: *Calligypona isis* LINNAUVUORI, 1958.

Remarks: *Luxorianella* forms a very distinct genus which is characterized by the combination of an extremely small body size, an "*Eurysa*"-like external appearance with rounded head and shortened tegmina, a fully dentated post-tibial spur, and especially by a unique set of characters of the male genitalia which are here regarded as constitutive: diaphragm below the paramere-opening on each side with a bifurcate projection; aedeagus with a bilobate, pointed tip and lateral and dorsal subapical spines. *Luxorianella* belongs together with the genera *Smicrotatodelphax* KIRKALDY, 1906, and *Spinidelphacella* ASCHE, 1988, to those genera which contain the smallest known delphacid species. *Luxorianella* is a member of the tribe Delphacini sensu ASCHE (1985). The relationships to other genera of this tribe are still unknown. Some structures of the male genitalia such as the ventrocaudal emargination of the genital segment, the shape of the parameres (especially the distal dilated part, although it is converging instead of diverging), and perhaps the lateral spinulation of the aedeagus show certain similarities to the genus *Rhombotoya* FENNAH, 1975, which, however, differs considerably in other characters.

Luxorianella isis (LINNAUVUORI) comb. nov. (Figs 46-59)

Calligypona isis LINNAUVUORI, 1958: 35.

Small species, total length: 1.5 mm. *L. isis* can be distinguished by the following characters: coloration of head and abdomen brownish ("coffee-brown"): LIN-



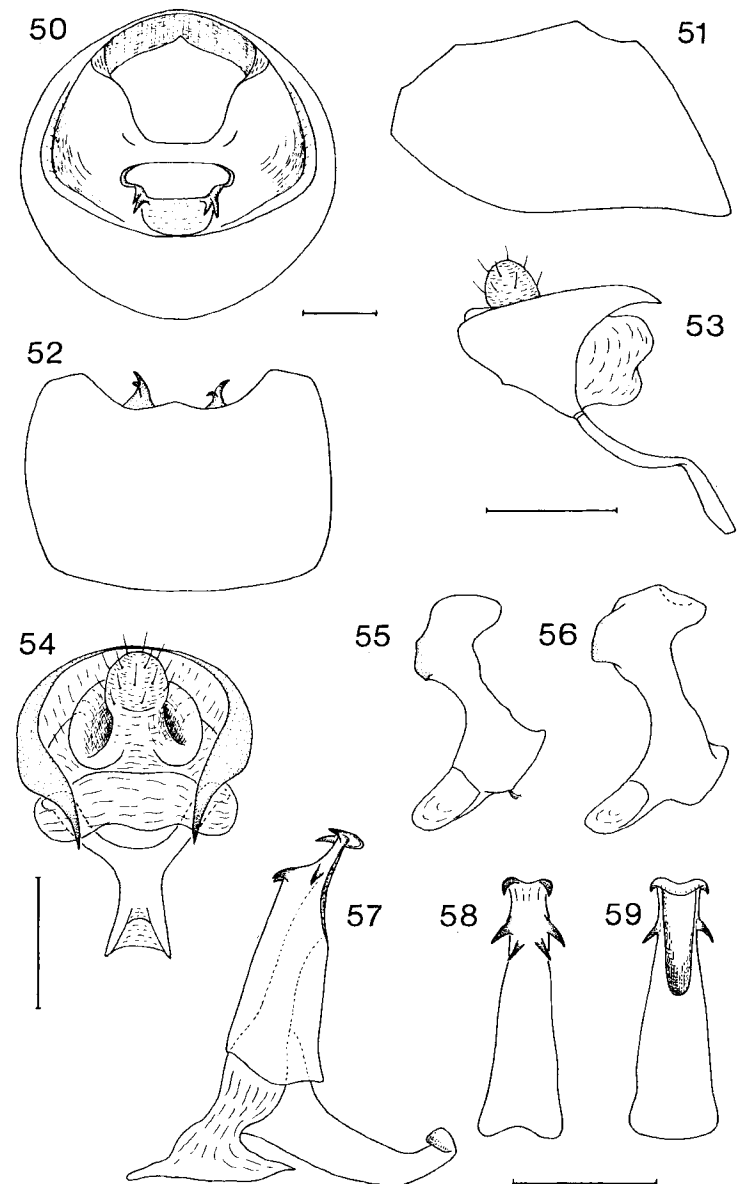
Figs 46-49. - *Luxorianella isis* (LINNAVUORI), holotype ♂. 46: head and thorax, dorsal aspect; 47: head, right lateral aspect; 48: head, frontal aspect; 49: left tegmen. Scale: 0.1 mm

NAVUORI, 1958); head and thorax (Figs 46-49) as in genus description; post- and anteclypeus pale yellow; pro- and mesonotum caramel; tegmina translucent, diffusely light brown; legs stramineous. Post-tibial spur with 18 minute teeth on its inner margin.

Male genitalia (Figs 50-59): ventrocaudal margin of the genital segment quarter-circularly excavated, in the centre of this emargination slightly produced caudad; diaphragm bowl-like sunk cephalad, dorsal margin broadly u-shaped, opening for parameres flat mushroom-shaped, at each ventral corner of this opening arises a conspicuous bifurcate process which is directed ventrad. Anal segment with lateroventral processes small, claw-like, directed medioventrad; anal style rather short. Parameres broad at base with a cone-shaped projection directed mediocaudad; then forming a short, slender stem which distally abruptly expands to an almost flat, subrectangular apex; parameres distally converging. Aedeagus compressed, tapering to apex, distally projected into two lobes which crown the tip and which are pointed to the dorsal side; basad of these lobes on left and right side a short claw-like process; subapically on dorsal side a pair of short teeth.

Females: unknown.

Material examined: Holotype ♂, brachypterous, bearing the white labels "Luxor", "J. SAHLB. (ERG)", and a red label "Type"; in AMNH.



Figs 50-59. - *Luxorianella isis* (LINNAVUORI), holotype ♂. Male genitalia; 50: genital segment, ventrocaudal aspect; 51: same, left lateral aspect; 52: same, ventral aspect; 53: anal segment, left lateral aspect; 54: same with suspensorium, ventrocaudal aspect; 55: left paramere, ventrocaudal aspect; 56: same, against 55 slightly moved mediad; 57: aedeagus with connective, left lateral aspect; 58: same, dorsal aspect; 59: same, ventral aspect. Scale: 0.1 mm.

Metropis FIEBER

Metropis FIEBER, 1866: 529. Type species: *Metropis mayri* FIEBER, 1866 (type locality in Austria), by subsequent designation of OSHANIN, 1912.

Atropis KIRSCHBAUM, 1868: 10. Type species: *Atropis latifrons* KIRSCHBAUM, 1868 (type locality in Germany), by monotypy; synonymized by FIEBER, 1872.

Remarks: The genus *Metropis* includes small-sized, slender, mostly brachypterous and sexually dimorphic species (males usually shiny black and females pale yellowish to stramineous). Currently, *Metropis* including the subgenus *Metropidius* (see EMELJANOV, 1972) contains about 15 species distributed from Western Europe throughout Central and Eastern Europe, Siberia to the Far East, and to Mongolia. European species of this genus have recently been studied by ASCHE *et al.* (1983b) and D'URSO & ASCHE (1984), Asian and Kazakhstania species by ANUFRIEV (1991).

Metropis obscurus n.sp. (Figs 60-71)

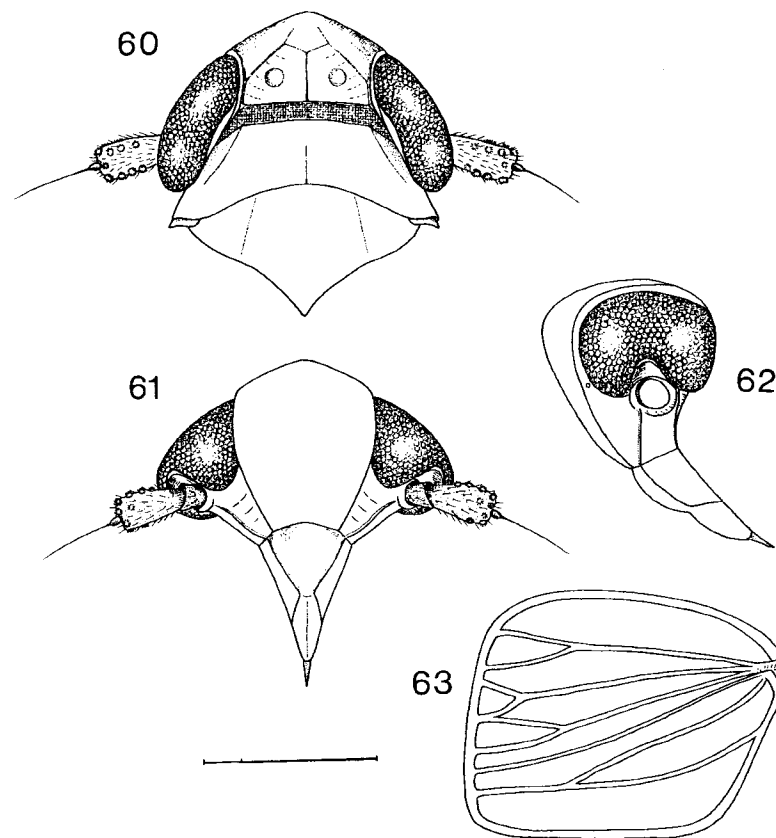
Males brachypterous: small and slender species, habitus and coloration as typical for the congeners: body and tegmina shiny black, legs dirty stramineous to diffusely brown, last tarsal segments darker, first antennal segment dark brown, second antennal segment medium to light brown.

Head (Figs 60-62): Head including compound eyes 1.7 times wider than vertex at base, and 1.1 times wider than the pronotum. Vertex 1.7 times wider at base than medially long, carinae obsolete, compartments indicated by very shallow impressions, anteriorly slightly projected, evenly rounding onto frons. Frons vaulted, almost as high as wide (1.1:1), widest at upper level of the compound eyes, 1.3 times higher than post- and anteclypeus together; lateral carinae convex, median carina absent. Postclypeus vaulted, limited from anteclypeus by a notch, lateral carinae ridged, median carina callous-like; anteclypeus compressed with a distinct median carina. Oblique carina of genae ridged. Antennal segments subcylindrical, second segment 2.2 times longer than the first; number and arrangement of sensory fields: 16-7. Compound eyes large, anteriorly almost reaching the lateral frontal margins; ocelli absent. Rostrum short, hardly attaining the middle coxae.

Thorax (Figs 60, 63): Pronotum vaulted, medially 0.7 times shorter than vertex, hindmargin gently concave, carinae obsolete. Mesonotum medially 2.3 times longer than pronotum, evenly vaulted, carinae obsolete. Tegulae rudimentary. Tegmina strongly shortened, coreaceous, just attaining the fifth abdominal tergite, distally truncate, venation reduced, rather indistinct. Hind legs: tibia 1.3 times longer than tarsal segments together; first tarsal segment 1.3 times longer than second and third tarsal segment together, and 1.5 times longer than the post-tibial spur, distally with 7 spines (2+5), second tarsus distally with 4 spines in a row. Post-tibial spur solid, subtriangular in cross section, on inner margin with about 10 minute teeth.

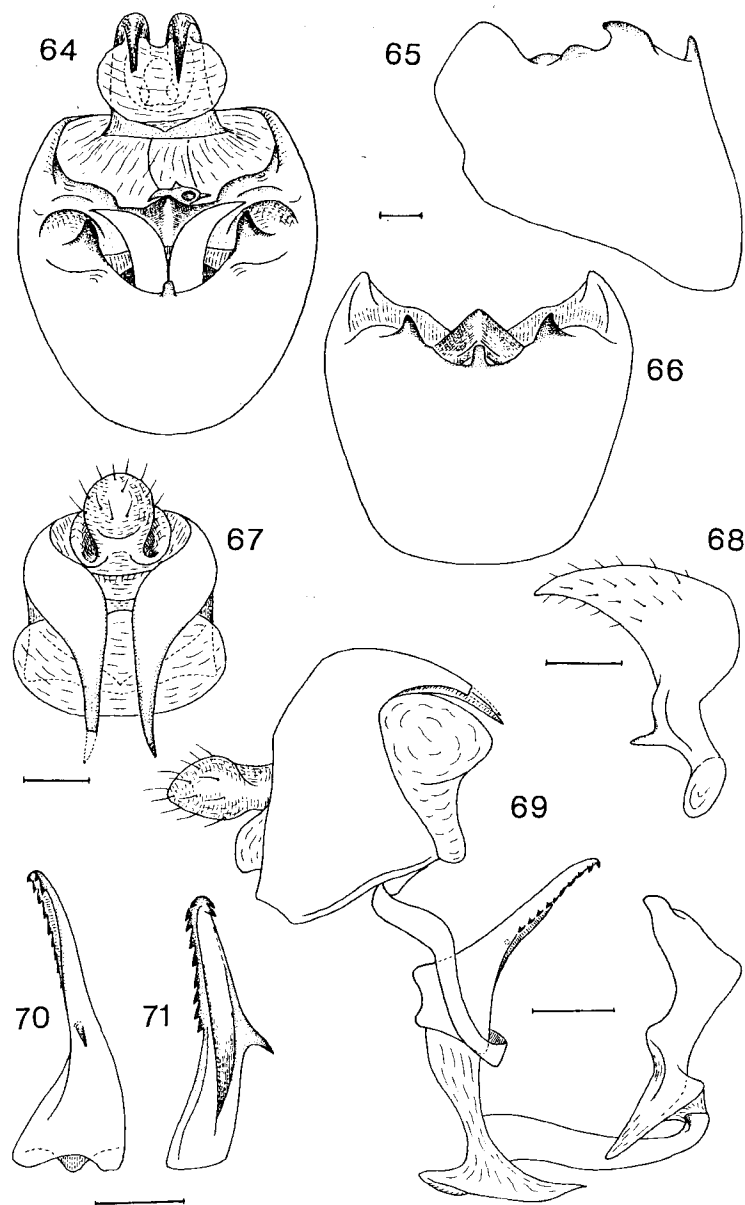
Total length: 2.3-2.4 mm.

Male genitalia (Figs 64-71): Genital segment in caudal aspect ovate, about 1.2 times wider than high, caudal margin with various folds and lobe-like projections; in lateral aspect generally trapezoidal with caudal margin irregular, laterodorsal angles slightly projected, forming almost a right angle, ventrally about 3.9 times longer than dorsally; ventrocaudal margin deeply emarginated, on each side furnished with a cone-shaped projection, caudal margin dorsad of these cones bulbous; in the centre of the ventrocaudal emargination a single, tongue-shaped process; dia-



Figs 60-63. - *Metropis obscurus* sp. n., holotype ♂. 60: head and thorax, dorsal aspect; 61: head, frontal aspect; 62: head, left lateral aspect; 63: left tegmen. Scale: 0.1 mm.

phragm rather complex, reaching dorsad to the second third of the caudal side of the genital segment, dorsal margin broadly w-shaped, mediadorsally projected caudad forming a semi-cone which appears triangular in ventral view; opening for the parameres subovate, with a cone-shaped extension of the diaphragm at its medio-dorsal margin (as in other congeners). Anal segment short, ventrally not sclerotized, ventral side membranous forming a sack-like protrusion; lateroventral margins on each side extended to a long, ventrobasally curved spinose process. Parameres short, in ventral view slightly curved, strongly diverging, in length not exceeding the diaphragm; from a broad base to apex almost evenly tapering. Aedeagus comparatively short, in repose directed ventrocaudad, from a dilated base tapering to apex, ventral side mostly membranous, the left ventral margin with 9 teeth in a row; the right ventral margin laminate, distally with 2 teeth, at about one third of



Figs 64-71. - *Metropis obscurus* sp.n., holotype ♂. Male genitalia; 64: genital segment, ventrocaudal aspect; 65: same, left lateral aspect; 66: same, ventral aspect; 67: anal segment, ventrocaudal aspect; 68: left paramere, ventrocaudal aspect; 69: male genitalia, genital segment removed, left lateral aspect; 70: aedeagus, right lateral aspect; 71: same, ventral aspect. Scales: 0.1 mm.

its length a single rigid spine directed right laterad; phallotreme slit-like on the ventral side; suspensorium dorsally forming a rectangular tongue which then splits to embrace completely the base of the aedeagus; connective almost straight.

Females unknown.

Type material: Holotype ♂, brachypterous, NE Spain, Prov. Gerona, ca. 4 km SE Puerto de Tosas, ca. 1500 m, 6.VI.1979, M. ASCHE & H. HOCH; in ZMH. Paratypes: 2 ♂♂, brachypterous, same data as holotype; in AH, BMNH.

Remarks: Within the genus, *M. obscurus* displays a very characteristic configuration of the caudal margin of the genital segment by various projections and bulbous structures. A possible close relative might be *M. incisus* LOGVINENKO, 1970, from Georgia which shows certain similarities in the presence of a vertical row of teeth on the left ventral margin and a single spinose process on the right side of the aedeagus. In addition, the genital segment of *M. incisus* possesses "three processes on lower wall: two lateral processes directed upward, and one median process directed backward" (LOGVINENKO, 1970) - a rather similar configuration to *M. obscurus*. Differences between these two species, however, lie in details of the male genital armature, especially in the shape of the left lateral row of teeth, the position of the right spinose process far more basad, and in the slit-like phallotreme on the ventral side of the aedeagus. The Central Asian species *M. alexandri* ANUFRIEV, 1991, and to *M. alatavicus* MITJAEV, 1990, might also be considered as potential relatives to *M. obscurus*, as they show similarities in the shape of the genital segment and the aedeagus. It is possible that *M. tolerans* EMELJANOV, 1972, from Eastern Siberia and Mongolia also belongs to the same group of apparently closely related species within the genus. It differs from *M. obscurus* in the lack of the cone-shaped lateral processes and of a central projection at the ventrocaudal margin of the genital segment, and in the configuration of teeth and spinose processes of the aedeagus (see EMELJANOV, 1972). The question as to whether or not *M. obscurus* might be identical with the taxonomically hitherto unclear species *M. maurus* FIEBER, 1866, described from the Pyrenées, cannot definitely be answered, since - according to WAGNER (1939) - the type material of *M. maurus* (collection MINK) is apparently lost. Nevertheless, the illustrations of *M. maura* (sic) published by FIEBER (1866) in the original description show differences in the shape of the genital segment; thus they do not support the assumption of conspecificity with *M. obscurus*. *M. obscurus* was collected by sweeping grasses on an open, rather moist slope next to a creek facing south.

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Observations phénologiques sur *Chorthippus mollis* (CHARP.)
(Orthoptera, Acrididae) au pied sud du Jura¹

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Phenological data on the grasshopper Chorthippus mollis (CHARP.) (Orthoptera, Acrididae) at the southern foot of the Swiss Jura. – As with many *Chorthippus*, *Chorthippus mollis* hatches late in the field, i. e. end of spring. The first instar larvae appear shortly after several days with high temperature. The larval development is long, in part due to the 5 instar cycle of the species, and the presence of an additional 6th instar doesn't prolong the presence of larvae in the population. The length of adult life is shortened by the arrival of winter conditions. The life-span of an adult *C. mollis* is therefore relatively long compared to other Acrididae, compensating for the late arrival of larvae.

Keywords: Orthoptera, Acrididae, *Chorthippus mollis*, Swiss Jura, phenology, population.

INTRODUCTION

Le présent article est la dernière publication du travail de doctorat de l'auteur (THORENS, 1988, 1989, 1990, 1991a, 1991b, 1992, 1993). Deux populations de Criquets de l'espèce *Chorthippus mollis* (CHARP., 1825) ont été étudiées sous divers aspects dans deux stations du pied sud du Jura.

MATÉRIEL ET MÉTHODES

Les deux stations sont des prairies sèches situées au bord du Lac de Neuchâtel (nord-ouest de la Suisse): Neuchâtel (NE) et Onnens (ON). Une troisième station, à l'ouest de Neuchâtel, Le Landeron (LE), a fourni une comparaison avec l'espèce voisine *Chorthippus biguttulus* (LINNÉ, 1758). Les échantillonnages ont été réalisés à l'aide d'un cadre de type biocénomètre. Les données climatiques utilisées dans l'analyse (station NE) proviennent de la station météorologique de l'Observatoire de Neuchâtel. Pour la comparaison phénologique de la végétation et de l'éclosion de nos criquets, nous avons choisi, dans la station NE et lors de la première année (1984), 12 plantes de référence: pour chacune a été noté son état de floraison ou de fructification (tab. 2), faisant référence pour la comparaison entre années. Un relevé est effectué chaque année, quelques jours avant les éclosions.

En 1987, un deuxième relevé nettement plus précoce est donné pour comparaison. La description détaillée des stations et des méthodes figurent dans les travaux cités ci-dessus, comme celles se rapportant à d'autres résultats utiles à la discussion (microclimat, incubations et élevages en laboratoire, biométrie des larves et des adultes).

(1) ce travail fait partie de la thèse de doctorat de l'auteur.