LYGISTOPTERUS ESCALERAI PIC, 1942 STAT. NOV., AND OTHER NOTES ON THE GENUS *LYGISTOPTERUS* MULSANT, 1838 IN THE PALAEARCTIC REGION (COLEOPTERA: LYCIDAE)

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ABSTRACT: The Palaearctic species of *Lygistopterus* Mulsant, 1838 are examined, giving a detailed iconography of the main diagnostic characters. The subspecies *L. sanguineus escalerai* Pic, 1942 is elevated to the rank of species (*L. escalerai* stat. nov.). Lectotypus and Paralectotypi of *Lygistopterus anorachilus* Ragusa, 1883 are designated.

KEY WORDS: *Lygistopterus*, *Lygistopterus escalerai, Lygistopterus anorachilus*, Lectotypus.

The genus *Lygistopterus* Mulsant, 1838 (type species *Cantharis sanguineus* Linnaeus, 1758) is represented in the Palaearctic Region by three species: *L. anorachilus* Ragusa, 1883, *L. cobosi* Pardo-Alcaide, 1961, and *L. sanguineus* (Linnaeus, 1758); the last taxon being subdivided into two subspecies, the nominal one and *L. s. escalerai* Pic, 1942.

This genus has recently been studied by Fanti & Vitali (2013), who analyzed dozens of specimens from Italy, France (including Corsica), and Luxembourg and who have for the first time drawn some anatomical parts, confirming that *Lygistopterus anorachilus* and *L. sanguineus* are valid species.

We examined about 200 specimens, mainly from the entire Western Palaearctic distribution of the genus (several countries of Europe, plus Caucasus, and Armenia). Due to the considerable variability of some morphological aspects and of the pigmentation of some anatomical parts, we provide a large iconographical set, representing series of epistomia, pronota, and aedeagi. We are able to confirm the separation of *L. anorachilus* and *L. sanguineus*, and also to make some considerations about *L. sanguineus escalerai* Pic, 1942. Concerning *L. cobosi*, this taxon is known only for a single specimen from Morocco, preserved in the Pardo-Alcaide collection; however, notwithstanding the willingness of some Spanish colleagues, it has been impossible to find this type.

MATERIALS AND METHODS

The studied material comes from the entomological collections of the Natural History Museum of the University of Florence, Zoological Section (= MZUF), of the Natural History Museum of Milan (= MSNM), from the one of one of the Authors (Filippo Ceccolini = FC), and the Ragusa collection preserved in the Department of Animal Biology of the University of Catania (= CR).

All the genitalia of male specimens have been extracted and examined under a stereomicroscope. In some cases, we illustrate some anatomical parts that we

consider fundamental for the diagnostic of the different taxa (rostrum, pronotum, aedeagus). Through words "m" and "f" we indicate respectively male and female.

Names of places are written as in the original labels (only the names of states are translated in English). In square brackets some our explications are added.

STUDIED MATERIAL

Lygistopterus anorachilus Ragusa, 1883

ITALY: Molise: passo di Rionero Sannitico (IS), 11.8.2010, F. Ceccolini & E. Paggetti leg., 1 m, FC; Lazio: Capo Circeo (Quarto medio basso) (LT), 9.7.1940, 1 m [without aedeagus], MSNM; Capo Circeo (Quarto freddo alto) (LT), 11.7.1940, 1 m; Calabria: Sila Grande, Fossiata (CS), m 1300, 13.8.1970, F. Terzani leg., 1 m, MZUF; Sila Grande (CS), f. Cecita, m 1150, 17.8.1970, F. Terzani leg., 1 m, MZUF; Sila Grande, Colle Napoletano, m 1300-1350, Camigliatello Silano (CS), 5.8.1970, F. Terzani leg., 1 m, MZUF; Sila Grande, La Corsonara, m 1300, Camigliatello Silano (CS), 3.8.1970, F. Terzani leg., 1 m , MZUF; Sila Grande, recinto dei Daini [= fence of fallow deers], m 1170, Camigliatello Silano (CS), 24.8.1970, F. Terzani leg., 1 m, MZUF; Sicilia: Ficuzza [Wood of the] (PA), E. Ragusa leg., 4 m, CR.

Lygistopterus sanguineus (Linnaeus, 1758)

AUSTRIA: Carinzia: Dobratsch territory, A. Sazmaier leg., 2 m, MSNM; Stiria: H.-Schwab St. [= Hochschwab], 7.1905, 1 m 4 f, MSNM; Umgb. [= surroundings] Graz, Messa leg., 1 m, MSNM. Wien: Umgeb. [= surroundings] Wien, 7.1910, 1 m, MSNM.
BOSNIA-HERZEGOVINA: Rataj, 1.7.1911, Neuhaus leg., 2 m, MSNM; Poda, 28.7.1911, Neuhaus leg., 1 m, MSNM; Ravna Gor, 28.7.1911, Neuhaus leg., 1 m 1f , MSNM; Stambulcic [= Stambolcic], 17.7.1910, Neuhaus leg., 1 m 4 f, MSNM.
FRANCE: Corsica: between Col di Bavella and M. Velaco, m 1300, 5.8.1972, A. Bucciarelli, E. Granchi, B. Lanza leg., 3 m 1 f, MZUF; Rio d'Agnone, Vizzavona, m 900, 3.8.1977, B. Lanza; 1 f, MZUF; Gironde: Blaye, 6.1952, P. Ardoin leg., 1 f, MZUF; Alvernia: Chatel Guyon, 7.1913, 1 m, MZUF.
GERMANY: Sassonia, 1 m, MSNM.
GREECE: Macedonia: Mont Athos, 1 m, MSNM.
ITALY: Alpi Italiane, L. Usslaub leg., 1 m 1 ex. [without abdomen], MZUF; Calabria: Monte Scuro, Sila (CS), 5.7.1939, E. Moltoni leg., 7 m 1 f, MSNM; Sila (CS/CZ), 5.8.1949, E. Busolini & M. Etonti leg., 2 m 1 f, MSNM; Gambaria [= Gambarie], Aspromonte (RC), 26.6.1993, R. Lisa leg., 10 m 4 f, MZUF; Sila Grande, S. Barbara (CS), m 1400, 5.8.1970, F. Terzani leg., 3 m 1 f, MZUF; Liguria: Baiardo, M. Ceppo (IM), 31.7.1948, S. Failla leg., 1 f, MZUF; Lombardia: Val Furva (SO), 29.7.1894, 2 m, MSNM; Marche: Avellana (PU), G. Cavanna leg., 2 m, MZUF; Piemonte: M. Rosa, Macugnaga (VB), 20.7.?, Borca leg., 2 m, MSNM; Macugnaga (VB), 1.8.1911, V. Ronchetti leg., 5 f, MSNM; Meana (TO), Alpi Cozie, 28.6.1953, A. Fabiani leg., 3 m, MSNM; Val di Susa (TO), 8.1950, G. Loro leg., 1 m, MSNM; Malesco (VB), 5.1921, T. Castellani leg., 1 m, MSNM; Sicilia: Dintorni [= surroundings] Palermo, 1.1918, F. Muzzi leg., 1 m, MSNM; Sicilia, E. Ragusa leg., 1 m, MSNM; Toscana: S. Margherita, Firenze, 13.6.1936, A. Martelli leg., 2 m, MSNM; dint. [= surroundings] Firenze, 4.1926, M. Lombardi leg., 2 m, MSNM; dint. [= surroundings] Firenze, 6.1926, M. Lombardi leg., 1 m 1 f, MSNM; Gamberaia, Firenze, 6.1936, B. Lanza leg., 3 m 1 f, MZUF; S. Margherita a Montici, Firenze, 10 m 1 f, MZUF; Cont. [= surroundings] di Firenze, Pucci leg., 2 m, MZUF; Cont. [= surroundings] Firenze, F. Piccioli leg., 1 m, MZUF; Cascine [Park], Cont. [= surroundings] Firenze, F. Piccioli leg., 1 m, MZUF; Cascine [Park], Firenze, 6.1939, A. Martelli leg., 5 m, MZUF; Cascine [Park], Firenze, 23.6.1961, S. Failla leg., 1 f, MZUF; torrente Ema, Galluzzo, Firenze, 5.7.1972, F.Terzani & A. Zanotti leg., 1 m, MZUF; Pieve S. Lazzaro a Lucardo, Montespertoli (FI), 10.7.1988, B. Cecchi leg., 1 f, MZUF; [Bagno a] Ripoli, Valdarno (FI), 6.1898, O. Beccari leg., 9 m 3 f, MZUF; Firenze, 10.7.1959, 4 m 1 f, MZUF; Cave di Maiano, Firenze, 22.6.1963, S. Failla leg., 1 m, MZUF; Pisa, G.L. Carrara leg., 2 f, MZUF; Lucignano (AR), 10.7.1921, A. Marchi leg., 1 f, MZUF; Torrita [di Siena], 6.1912, A. Marchi leg., 1 m, MZUF; Trentino-Alto Adige: Val d'Ultimo (BZ), 9.7.1934, M. Barajon leg., 1 m, MSNM; Canazei (TN), 8.1951, S. Failla leg., 1 m 1 f, MZUF; Valle d'Aosta: Brusson (AO), 7.1952, 2 m, MSNM, 1 f, MZUF; Colle d'Joux [= di Joux], Saint Vincent (AO),

3.8.1957, A. Porta leg., 1 f, MSNM; Entrève (AO), 7.1946, F. Solari leg., 1 f, MSNM; La Thuile (AO), 8.1953, 1 m, MSNM; Valsavaranche (AO), A. Gagliardi leg., 2 m, MSNM; Valsavaranche (AO), 7.1995, C. Tendi leg., 3 m 2 f, MZUF; Cogne (AO), Alpi Graje, 18.7.1935, A. Schatzmayr & Tasso leg., 3 m, MSNM; Cogne (AO), 4.8.1971, S. Failla leg., 1 f, MZUF; Verres (AO), 6.7.1952, 1 f, MZUF.
POLAND: Bassa Slesia: Schweidnitz [= Swidnica], A. Porta leg., 1m 2 f, MSNM.
CZECH REPUBLIC: Moravia-Slesia: Hnojnik [= Gnjnik = Hoinik], 5 m 2 f, MSNM; Moravia: Prossnitz [= Prostejov], R. Heilig leg., 1 m, MZUF.
ROMANIA: Maramureş: Marmaros (Hungaria bor.) [= Sighetu Marmatiei], E. Reitter, 1 m, MZUF.
RUSSIA: Sibirien, E. Reitter & H. Leder leg., 1 m, MZUF.
SPAIN: Cantabria: Espinama, Hi. s. Cord. Cantabr., 24.6.1934, C. Koch leg., 2 m 1 f, MSNM.
SWITZERLAND: Grigioni: Davos, 8.1894, 2 m 1 f, MSNM; Ticino: Airolo, 26.VI.1938, G. Pozzi leg., 1 f, MSNM; Vallese: M. Bianco, Ferret, 16.7.1935, Tasso, A. Schatzmayr & K. Koch leg., 1 f, MSNM.

***Lygistopterus escalerai* Pic, 1942 stat. nov. (see below)**
ARMENIA: Nor Arachadzor lake, Artsvanik, 4.7.2005, L. & M. Bartolozzi leg., 1 f, MZUF .
RUSSIA: Ossezia del Nord [= North Ossetia]: Rekom, 16.7.1910, V. Ronchetti leg., 5 m 5 f, MSNM.

The specimens chosen for the iconographical representation are listed in table 1.

DISCUSSION

The analysis of the characters performed by Fanti & Vitali (2013) is essentially referred to these parts: pronotum, III-IV antennomeres, epistomium, and aedeagus. Since these Authors consider "an illusory character" the one referred to the antennomeres, we have analyzed the other ones.

As concerning the epistomium (anterior margin of rostrum) of *L. anorachilus*, we observed strong uniformity in the shape (Fig. 1) which is bisinuate, as seen by the precedent Authors (Ragusa, 1883, 1884; Pardo-Alcaide, 1961a; Fanti & Vitali, 2013), while we observed high morphological variability in *L. s. sanguineus* (Figs. 2-8). As far as we known, our figures are the first ones referred to the epistomia of these two species of *Lygistopterus*.

Our analysis confirms that the ratio between the rostrum width (taken at the basis of antennae) and the rostrum length (taken from the median point of the immaginary line connecting the antennae to the end of the rostrum) is different in the two species. In fact, the ratio value is 1,9÷2,0 in *L. anorachilus,* while it is 1,4÷1,5 in *L. s. sanguineus*, with the exception of a male of Cantabria (Spain) in which it is ~1,2.

The pronotum tends to have a trapezoidal shape in both species with a larger hind part; nevertheless, in *L. anorachilus* it is always present a basal enlargement and the central dark band is constantly very wide, while in *L. s. sanguineus* the pronotum shape and the dark band are much more variable (Figs. 10-18). As a matter of fact, one specimen from Switzerland has a nearly rectangular pronotum (Fig. 17), whereas in some cases we can observe an asymmetrical irregularity of lateral rims (Fig. 18). The variability of the pronotum colour in *L. s. sanguineus* is remarkable too: the width of the central band can be as large as it is in *L. anorachilus* (Fig. 12) or very reduced (Fig. 15).

Considering the aedeagus, the parameres are a distinctive character because in *L. anorachilus* the ratio between length and width is about 3:1, while as a rule in *L. s. sanguineus* it is about 2:1 (Figs. 21-26), even if a specimen of Bosnia-Herzegovina shows a ratio value of 2.6 (Fig. 26). Moreover, in *L. anorachilus* the

parameres are compressed at the mid-length, whilst in *L. s. sanguineus* they are usually slightly enlarged.

The values of the body length fit well with those given by Fanti & Vitali (2013).

Among the specimens of *L. anorachilus* that we studied, there are 4 males from Ragusa's collection. The typical series described by Ragusa consists of 2 females and 2 males, discriminated by the length of antennae (Ragusa, 1883). Dissecting those specimens, we verified that they are all males. Moreover, only one of these specimens is labelled "Sicilia, Ficuzza, E. Ragusa" (Fig. 28); another specimen is labelled "*Lygistopterus* sp. nov." and "♀"; a third one is determinated "*Lygistopterus sanguineus* L., ♂"; the last one is lacking labels. Making a calligraphic comparison, we noted that only the label of the first specimen was written by Ragusa himself, while the other labels are written with a different handwriting. We believe that the analyzed series is actually the typical one, notwithstanding the mistakes in sex and species determination, because the total number of individuals is the same and sex discrimination was made by Ragusa (1883) accordingly to the length of the antennae, a character which is not useful for this purpose. So, according to these considerations, we designate as Lectotypus the specimen with the label with the locality, and as Paralectotypi the three other specimens of the series.

We have also observed some male specimens of *L. s. escalerai* from Armenia and North Ossetia (Russia) and we compared them with the description of this taxon made by Pic: "*Lygistopterus sanguineus* v. n. *Escalerai* [Malac.]. *Niger, torace luteo, postice medio late nigro maculato, antice nigrosulcato, elytris luteo-rufis*. Asie Mineure" (Pic, 1942). Even if we could not examine the material seen by Pic, the morphology of our specimens perfectly fits with the description made by the French entomologist and we can attribute these individuals to the taxon "*escalerai*".

The dimensional ratios of the rostrum are consistent with those registered for *L. s. sanguineus*, but the shape of the epistomium is more curved (Fig. 9). As far as the pronotum is concerned, even if showing a certain variability, it has always a central band equal to that described by Pic (1942) (Figs. 19-20). We have also extracted aedeagi of these samples. While the dimensional ratios of the aedeagi are similar to those of *L. anorachilus*, the morphology is different both from *L. sanguineus* and *L. anorachilus*, because it is more slender at the apex (Fig. 27). Thus, we came to the conclusion that the taxon described by Pic should be elevated to the rank of species: *Lygistopterus escalerai* Pic, 1942 stat. nov.

Concerning *L. cobosi*, the description by Pardo-Alcaide (1961b), based on a single specimen, considers only morphological characters which are too variable in this genus. As we had not the possibility to study the typus and so to examine the aedeagus, we can not express an opinion of the validity of this taxon.

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Table 1. List of all specimens chosen for the iconographical representation. For each one the anatomical part figured and region or state of capture are reported.

N° fig.	Taxon	Anat. part	Place	N° fig.	Taxon	Anat. part	Place
1	*L. anorachilus*	Rostrum	Lazio	15	*L. sanguineus*	Pronotum	Valle d'Aosta
2	*L. sanguineus*	Rostrum	Calabria	16	*L. sanguineus*	Pronotum	Toscana
3	*L. sanguineus*	Rostrum	Sicilia	17	*L. sanguineus*	Pronotum	Switzerland
4	*L. sanguineus*	Rostrum	Valle d'Aosta	18	*L. sanguineus*	Pronotum	Austria
5	*L. sanguineus*	Rostrum	Corsica	19	*L. escalerai*	Pronotum	Armenia
6	*L. sanguineus*	Rostrum	Corsica	20	*L. escalerai*	Pronotum	North Ossetia
7	*L. sanguineus*	Rostrum	Switzerland	21	*L. anorachilus*	Aedeagus	Calabria
8	*L. sanguineus*	Rostrum	Bosnia-Herz.	22	*L. sanguineus*	Aedeagus	Valle d'Aosta
9	*L. escalerai*	Rostrum	North Ossetia	23	*L. sanguineus*	Aedeagus	Calabria
10	*L. anorachilus*	Pronotum	Calabria	24	*L. sanguineus*	Aedeagus	Cantabria
11	*L. anorachilus*	Pronotum	Calabria	25	*L. sanguineus*	Aedeagus	Austria
12	*L. sanguineus*	Pronotum	Calabria	26	*L. sanguineus*	Aedeagus	Bosnia-Herz.
13	*L. sanguineus*	Pronotum	Calabria	27	*L. escalerai*	Aedeagus	North Ossetia
14	*L. sanguineus*	Pronotum	Valle d'Aosta				

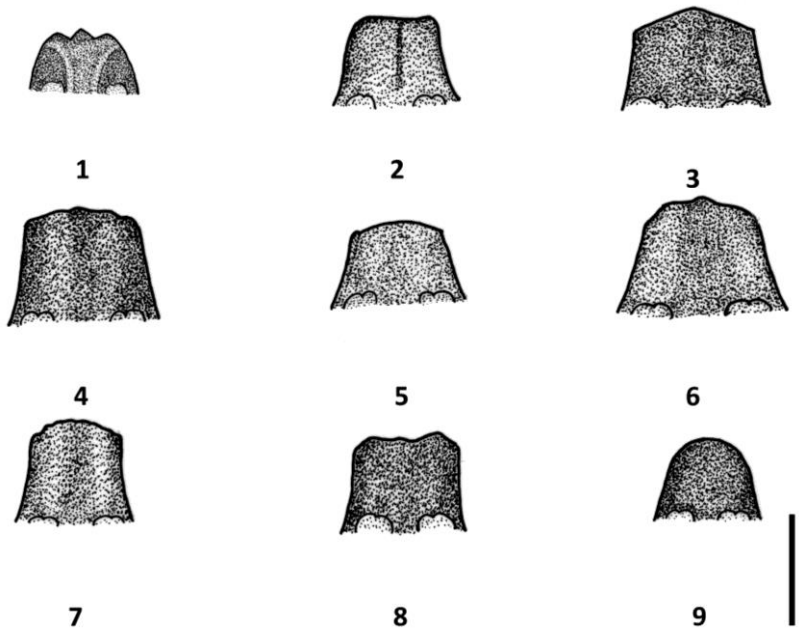

Plate I. 1. Rostrum of *Lygistopterus anorachilus* (Lazio), 2. Rostrum of *L. sanguineus* (Calabria), 3. Rostrum of *L. sanguineus* (Sicilia), 4. Rostrum of *L. sanguineus* (Valle d'Aosta), 5. Rostrum of *L. sanguineus* (Corsica), 6. Rostrum of *L. sanguineus* (Corsica), 7. Rostrum of *L. sanguineus* (Switzerland), 8. Rostrum of *L. sanguineus* (Bosnia-Herzegovina), 9. Rostrum of *L. escalerai* (North Ossetia). Scale bar = 1 mm.

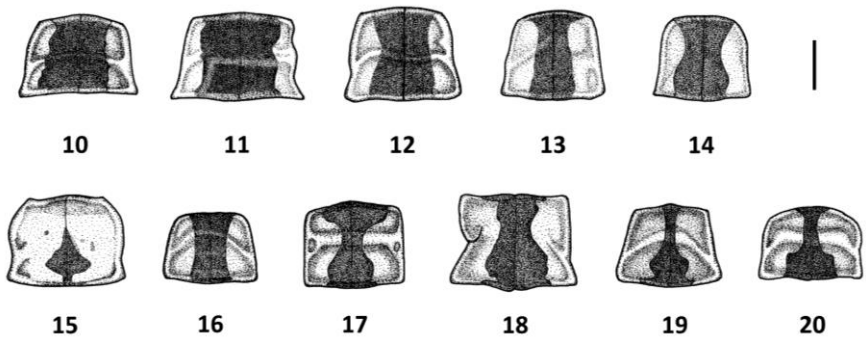

Plate II. 10. Pronotum of *L. anorachilus* (Calabria), 11. Pronotum of *L. anorachilus* (Calabria), 12. Pronotum of *L. sanguineus* (Calabria), 13. Pronotum of *L. sanguineus* (Calabria), 14. Pronotum of *L. sanguineus* (Valle d'Aosta), 15. Pronotum of *L. sanguineus* (Valle d'Aosta), 16. Pronotum of *L. sanguineus* (Toscana), 17. Pronotum of *L. sanguineus* (Switzerland), 18. Pronotum of *L. sanguineus* (Austria), 19. Pronotum of *L. escalerai* (Armenia), 20. Pronotum of *L. escalerai* (North Ossetia). Scale bar = 1 mm.

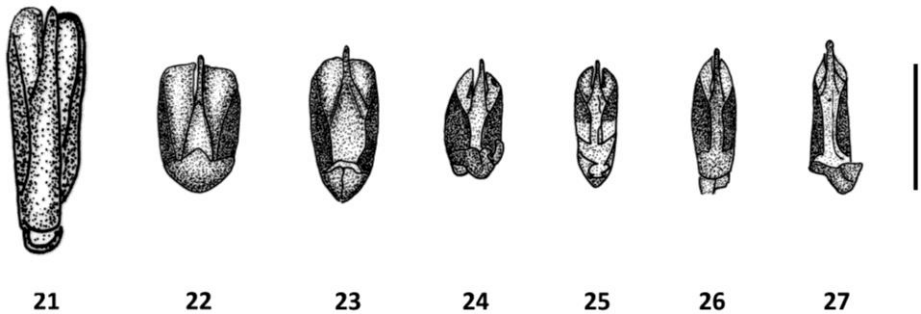

Plate III. 21. Aedeagus of *L. anorachilus* (Calabria), 22. Aedeagus of *L. sanguineus* (Valle d'Aosta), 23. Aedeagus of *L. sanguineus* (Calabria), 24. Aedeagus of *L. sanguineus* (Cantabria), 25. Aedeagus of *L. sanguineus* (Austria), 26. Aedeagus of *L. sanguineus* (Bosnia-Herzegovina), 27. Aedeagus of *L. escalerai* (North Ossetia). Scale bar = 1 mm.

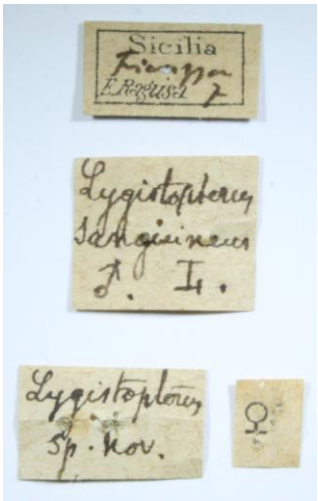

Figure 28. Original labels of the specimen of *Lygistopterus anorachilus* Ragusa, 1883 designated as *lectotypus*.