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# Proposal of a new arrangement of the Amelini genera Ameles Burmeister, 1838 and Parameles Saussure, 1869 status restauratus, with taxonomic remarks on some species

(Insecta: Mantodea: Amelidae)

#### Abstract

The taxonomy of the current Amelini genera *Ameles* Burmeister, 1838 and *Pseudoyersinia* Kirby, 1904 is substantially revised using many morphological features described in the text. Excluding the well characterized genus *Apteromantis* Werner, 1931, Amelini are divided into 2 genera: *Ameles* Burmeister, 1838 and *Parameles* Saussure, 1869 restored as a valid genus.

The genus Ameles Burmeister, 1838 includes 4 subgenera (2 new): 1) subg. Ameles (nominotypical) including Ameles spallanzania, Ameles maroccana, Ameles gracilis, Ameles occidentalis combinatio nova and Ameles battistoni nomen novum; 2) subg. Apterameles status restauratus including Ameles heldreichi, Ameles decolor, Ameles syriensis, Ameles arabica, Ameles kervillei, Ameles massai, Ameles wadisirhani, Ameles dumonti, Ameles moralesi and Ameles confusa status novus; 3) subg. Canariameles subgenus novum including Ameles limbata, Ameles teydeana combinatio nova, Ameles canariensis combinatio nova, Ameles subaptera combinatio nova, Ameles betancuriae combinatio nova and Ameles pilipes combinatio nova; and 4) subg, Pilosameles subgenus novum including Ameles aegyptiaca.

The genus *Parameles* Saussure, 1869 status restauratus includes 4 subgenera (2 new): 1) subg. *Parameles* (nominotypical) including *Parameles picteti* and *Parameles acuta* species nova; 2) subg. *Pseudoyersinia* combinatio nova including *Parameles brevipennis* combinatio nova, *Parameles lagrecai* combinatio nova, *Parameles inaspectata* combinatio nova, *Parameles kabilica* combinatio nova and *Parameles salvinae* combinatio nova; 3) subg. *Stenameles* subgenus novum including *Parameles poggii* combinatio nova and *Parameles melillensis* status restauratus et combinatio nova, and 4) subg. *Leptameles* subgenus novum including *Parameles paradecolor* combinatio nova, *Parameles andreae* combinatio nova and *Parameles paradecolor* combinatio nova, *Parameles andreae* combinatio nova and *Parameles insularis* combinatio nova.

The **nomen novum** Ameles battistoni is established for Pseudoyersinia maroccana after its new combination (homonymy with Ameles maroccana Uvarov, 1931). Taxonomy of some taxa is discussed: Mantis abjecta should be considered a **nomen dubium**; synonymy of Mantis nana and Mantis brevis with Ameles spallanzania is confirmed; synonymy of Ameles fasciipennis and Ameles spallanzania obscura with Ameles spallanzania is proposed; synonymy of Mantis assoi with Parameles picteti is confirmed. The new species Parameles acuta is described from Andalucía,

Morocco and Algeria. It differs from *Parameles picteti* for more distinctly acute eyes and for shape of male genitalia.

Key words: new subgenera, new species, Amelidae, Amelini, *Ameles, Pseudoyersinia, Canariameles, Apterameles, Leptameles, Pilosameles, Stenameles*, supra-specific arrangement.

#### Riassunto

[Proposta di una ristrutturazione sopra-specifica degli Amelini dei generi Ameles Burmeister, 1838 e Parameles Saussure, 1869 status restauratus, con osservazioni tassonomiche su alcune specie (Insecta: Mantodea: Amelidae)]

La tassonomia degli attuali generi di Amelini Ameles Burmeister, 1838 e Pseudoyersinia Kirby, 1904 è sostanzialmente revisionata mediante l'uso di numerosi caratteri morfologici descritti nel testo. Escludendo il ben caratterizzato genere Apteromantis Werner, 1931, gli Amelini sono divisi in due generi: Ameles Burmeister, 1838 e Parameles Saussure, 1869 restituito al rango di genere. Il genere Ameles Burmeister, 1838 include 4 sottogeneri (2 nuovi): 1) Ameles (s. str.) che comprende Ameles spallanzania, Ameles maroccana, Ameles gracilis, Ameles occidentalis combinatio nova and Ameles battistoni nomen novum; 2) subg. Apterameles status restauratus et combinatio nova che comprende Ameles heldreichi, Ameles decolor, Ameles syriensis, Ameles arabica, Ameles kervillei, Ameles massai, Ameles wadisirhani, Ameles dumonti, Ameles moralesi e Ameles confusa status novus; 3) subg. Canariameles subgenus novum che comprende Ameles subaptera combinatio nova, Ameles betancuriae combinatio nova and Ameles pilipes combinatio nova; 4) subg. Pilosameles subgenus novum che comprende Ameles aegyptiaca.

Il genere *Parameles* Saussure, 1869 status restauratus comprende 4 sottogeneri (2 nuovi): 1) subg. *Parameles* (s.str.) che comprende *Parameles picteti* e *Parameles acuta* species nova; 2) subg. *Pseudoyersinia* combinatio nova che comprende *Parameles brevipennis* combinatio nova, *Parameles lagrecai* combinatio nova, *Parameles inaspectata* combinatio nova, *Parameles kabilica* combinatio nova e *Parameles salvinae* combinatio nova; 3) subg. *Stenameles* subgenus novum che comprende *Parameles poggii* combinatio nova e *Parameles melillensis* status rest. et combinatio nova; 4) subg. *Leptameles* subgenus novum che comprende *Parameles paradecolor* combinatio nova, *Parameles andreae* combinatio nova e *Parameles paradecolor* combinatio nova, *Parameles andreae* combinatio nova e *Parameles paradecolor* combinatio nova.

Si stabilisce il **nomen novum** *Ameles battistoni* per la specie *Pseudoyersinia maroccana* a seguito della sua nuova combinazione (omonimia con *Ameles maroccana* Uvarov, 1931). Si discute la tassonomia di alcuni taxa: *Mantis abjecta* deve essere considerata un nomen dubium; si confermano le sinonimie di *Mantis nana* e *Mantis brevis* con *Ameles spallanzania*; si propongono le sinonimie di *Ameles spallanzania obscura* e *Ameles fasciipennis* con *Ameles spallanzania*; si conferma la sinonimia di *Mantis assoi* con *Parameles picteti*. Si descrive la nuova specie *Parameles acuta* dell'Andalucia, del Marocco e dell'Algeria. Essa differisce da *Parameles picteti* per gli occhi più distintamente acuti e per la morfologia dei genitali maschili.

Parole chiave: nuovi sottogeneri, nuova specie, Amelidae, Amelini, Ameles, Parameles, Pseudoyersinia, Canariameles, Apterameles, Leptameles, Pilosameles, Stenameles, revisione sopra-specifica.

## Introduction

The family Amelidae Westwood, 1889, according to the last revision (SCHWARZ et Roy, 2019) includes two tribes: Litaneutrini Jantsch, 1999, with three genera widespread in the arid areas of North America, and Amelini Westwood, 1889, widespread in Western Palearctic. More recent studies (starting from GIGLIO-Tos, 1927, with the addition of one genus by UVAROV, 1931) subdivide the Palearctic Amelini into three genera: *Ameles* Burmeister, 1838, characterized by brachypterous females and winged males, *Pseudoyersinia* Kirby, 1904, with both sexes brachypterous, and *Apteromantis* Werner, 1931, with both sexes completely apterous. However, no Author has studied critically this subdivision into genera, therefore the wings length continues to be adopted as a discriminating feature.

Personal observations, corroborated by many morphological examinations combined with biogeographical considerations, take me to reject the previous generic arrangement of Amelini, with the exception of *Apteromantis*, which is an uniform and well-characterized genus with only two described species.

The flying organs length should not be considered a valid character for generic division of Amelini anymore, for its high variability that presumably depends on environmental factors. In the morphological analysis less macroscopical but more constant features have been used: shape of the vertex (important in the generic subdivision), shape of the eyes (useful in the subgeneric division of *Parameles*), shape of pronotum (important at subgeneric level in *Ameles*), shape of fore femora (important at subgeneric level in *Ameles*), colour and pubescence of walking legs (adopted in generic and subgeneric subdivision), shape of cerci (useful in generic division), morphology of male genitalia (important at both genus and subgenus level).

In this first contribution to the knowledge of the taxonomy of Amelini I mainly propose a supra-specific rearrangement, taking stock of some misinterpreted species (*Mantis abjecta, Mantis nana, Parameles picteti, Mantis assoi*, see the dedicated chapters). I postpone to further studies the treatment of single species of some groups.

## History

- **BURMEISTER (1838)** in his description of *Mantis (Ameles)* lists 4 species, namely (in the order as they are listed): *Mantis nana* Charpentier, 1825, *Mantis minima* Charpentier, 1825, *Mantis aurantiaca* Burmeister, 1838 and *Mantis flavicincta* Oliver, 1792. The last three species were later assigned to different genera (in the order, *Iris* Saussure, 1869, *Acontista* Saussure, 1872, *Otomantis* Saussure, 1871). The first one is therefore considered the type species of genus *Ameles*.

- SAUSSURE (1869) raises Ameles to genus level (within tribus "Mantii", subtribus

"Mantites") and describes two other genera, which he nevertheless places in a different tribe for their conical eyes (tribus "Acanthopsii", subtribus "Harpagites"): *Yersinia* and *Parameles*.

According to Saussure, *Ameles* includes the species *Ameles spallanzania* (Rossi, 1792), with *Mantis nana* as synonym, and *Ameles decolor* (Charpentier, 1825).

*Yersinia* includes *Yersinia brevipennis* (Yersin, 1860) (previously *Mantis brevipennis*) and *Yersinia mexicana* (Saussure, 1859) (described as *Acanthops mexicana*).

*Parameles* includes only one species, described in the same work, *Parameles picteti* Saussure, 1869.

- SAUSSURE (1871) downgrades *Yersinia* and *Parameles* to subgenera of *Ameles*. The species *Mantis abjecta* Cyrillo, 1787 is recognized as a probable synonym of *Ameles spallanzania*. That is incorrect because the latter has been described 5 years after *abjecta*, whose name has accordingly the priority over *spallanzania*. Other taxa have been synonymized with this species: *Mantis nana* (probable, "?"), *Mantis brevis* Rambur, 1939 and *Mantis soror* Serville, 1839.

In addition the Author put *Mantis wagneri* Kittary, 1849 within genus *Ameles*, subgenus *Yersinia*. Later the species was transferred into genus *Oxyothespis* Saussure, 1870 (UVAROV, 1912).

Saussure mentions also *Mantis limbata* Brullé, 1838 and *Mantis gracilis* Brullé, 1838 as probable members of the genus *Ameles*, only on the basis of the original description and figures (BRULLÉ, 1838).

- JACOBSON and BIANKI (1902) report the species *Ameles spallanzania* as synonym of *Mantis abjecta*, correcting the priority mistake made by SAUSSURE (1871).

- KIRBY (1904) raises again *Yersinia* and *Parameles* to genus level. He reports the species *Ameles abjecta* with the confirmed synonym of *Mantis nana* (type species of *Ameles*). The Author reports also the following species within genus *Ameles*: *Ameles alliberti* (Guérin-Méneville, 1843) (previously in the genus *Perlamantis* Guérin-Méneville, 1843; later it will return into its own genus, as *Perlamantis allibeti*, in GIGLIO-Tos, 1913), *Ameles minima* (not yet transferred within genus *Iris*), *Ameles pusilla* (Eversmann, 1854) (described as *Mantis*, then placed within *Gonypeta* Saussure, 1869 (SAUSSURE, 1871), later in *Armene* Stål, 1877), *Ameles paui* Bolívar, 1898 and *Ameles gracilis*.

In the same work Kirby reports in the genus *Yersinia* the species *Yersinia mexicana* and *Yersinia solitaria* Scudder, 1898 (later placed in genus *Yersiniops* Hebard, 1931). The species *Yersinia brevipennis* is placed in a new genus, *Pseudoyersinia*, with the species *wagneri* and, with doubt, *aptera* Fuente, 1894 (described as *Ameles*).

Kirby puts within *Parameles* the following species: *Parameles picteti*, *Parameles limbata*, *Parameles assoi* (Bolívar, 1873) (described as *Mantis*), *Parameles brevis*, *Parameles heldreichi* (Brunner, 1882) (described as *Ameles*) and *Parameles* 

*taurica* Jakovleff, 1903. Therefore the Author places in *Parameles* the species with conical eyes, the feature used by SAUSSURE (1869) to distinguish it from *Ameles*.

- **GIGLIO-TOS (1927)** places *Parameles* as a synonym of *Ameles*. The synonymy is justified by the fact that *Ameles picteti* (type species of *Parameles*) is considered synonym of *Ameles nana* (type species of *Ameles*). *Ameles nana* is therefore interpreted as an elongate species with conical eyes, and not a more robust one with rounded/ovoid eyes.

*Ameles soror* is removed from the synonymy with *Ameles abjecta* stated by SAUSSURE (1871)<sup>1</sup>, and KIRBY (1904). According to the Author, *Ameles soror* differs from *Ameles abjecta* by its shorter tegmina (less than 4 times the pronotum length) and for female's not-folded abdomen. *Ameles brevis* appears in the keys as a species close to *Ameles nana*, and it means that it is another species far from *Ameles abjecta*, being part of a group with more elongate body and conical eyes. Also *Ameles modesta* (Bolívar, 1914) has been misinterpreted by Giglio-Tos (and by Kirby) because it is placed next to the species of *Parameles* (more slender, with conical eyes) while the syntypes of *Ameles modesta* (MNCN, MNHN) are clearly specimens of *Ameles spallanzania*.

Giglio-Tos places in the genus *Pseudoyersinia* also the species *aptera*, resolving the doubt of KIRBY (1904) about its generic assignment. The Author clearly distinguishes it from the other species of the genus for the lack of flying organs.

- WERNER (1931) describes the genus *Apteromantis* for the species *Ameles aptera* Fuente, 1894 and *Pseudoyersinia bolivari* Werner, 1929.

- UVAROV (1948) notes that *Ameles nana* and *Ameles brevis* are both described as species with a short pronotum, while other Authors (GIGLIO-TOS, 1927; MORALES AGACINO, 1947) considered them similar to *Ameles picteti* or synonyms of it. He establishes the synonymy of *Mantis brevis* with *Mantis nana*. Moreover the Author stresses that *Ameles abjecta* is a species with long pronotum and distinct from *Ameles nana*.

- **BEIER** (1950) describes the new genus and species *Apterameles rammei* from Macedonia. The description is based on a nymph of *Ameles heldreichi* (KALTENBACH, 1963).

- KALTENBACH (1963) synonymizes *Apterameles rammei* with *Ameles heldreichi*. He also synonymizes *Mantis nana* with *Mantis spallanzania*.

- AGABITI (2002) in her thesis deals with some Mediterranean species of *Ameles*. 24 species are mentioned, including *Ameles abjecta* as species inquirenda. In this work *Ameles nana* returns to be considered, wrongly, a species with long pronotum.

- BATTISTON, PICCIAU, FONTANA et MARSHALL (2010) mention 17 species of

<sup>&</sup>lt;sup>1</sup> SAUSSURE (1871) synonymized *Ameles soror* with *A. spallanzania*, at that time wrongly deemed to take priority over *A. abjecta*.

*Ameles* and 13 of *Pseudoyersinia* in the Euro-Mediterranean area. Treatment of *Ameles nana* and *Ameles assoi* are the same as in AGABITI (2002). *Ameles limbata* is synonymized with *Ameles gracilis* without giving any reason.

- AGABITI, SALVATRICE et LOMBARDO (2010) mention 24 species of *Ameles* (excluding *Ameles abjecta*). *Ameles nana* continues to be considered a valid species with long pronotum and *Ameles assoi* is resurrected from synonymy with *Ameles picteti* (AGABITI, 2002) without giving a reason. *Ameles modesta* Bolívar, 1914 and *Ameles africana* Bolívar, 1914 become synonyms of *Ameles spallanzania* without explanation.

# Materials and methods

A total of 181 specimens of 17 species have been examined. In addition to directly examined material, I obtained photos of type specimens of some species from the Museums and I have seen some of them on the high definition photos of some web sites (mnhn.fr; mantodearesearch.com): *Ameles fasciipennis, Ameles spallanzania obscura, Ameles confusa, Ameles moralesi, Ameles kervillei, Parameles paui, Parameles brevipennis, Parameles lagrecai.* I read the description of all known species of Palearctic species of *Ameles* and *Parameles* and further descriptions provided by other Authors, especially AGABITI (2002), AGABITI, SALVATRICE et LOMBARDO (2010) and BATTISTON et alii (2018).

On the occasion of a species-level revision of these genera I will examine type material of almost all known taxa, but it is not the intent of this study, which is a merely supra-specific revision of Amelini, with only some resolutions on a few critical species.

Dried specimens have been studied using a stereomicroscope with 20x and 40x enlargement. Male genitalia have been mounted on a transparent acetate label and included in Canada Balsam or Euparal.

The specimens are preserved in Marco Villani private collection, in the collectors' private collections or in museums, where specified.

Abbreviations:

MHNG: Muséum d'Histoire naturelle, Geneva, Switzerland

MNHN: Muséum national d'Histoire naturelle, Paris, France

MSNG: Museo Civico di Storia Naturale, Genova, Italy

MNCN: Museo Nacional de Ciencias Naturales, Madrid, Spain.

NMW: Naturhistorisches Museum Wien, Austria.

# Results

The result of this study is an almost complete taxonomic revision of the current genera *Ameles* and *Pseudoyersinia*. The genus *Parameles* Saussure, 1869, previously considered a synonym of *Ameles* (GIGLIO-Tos, 1927), is reinstated, and *Pseudoyersinia* becomes a subgenus of it. The genus *Ameles* is divided into 4 subgenera (2 of which are new) and the genus *Parameles* in 4 (2 new). *Apterameles* is rehabilitated to become a subgenus of *Ameles*. Many new combinations are consequently proposed.

The genus *Apteromantis* has not been involved in this taxonomic study for its homogeneity and for the presence of only two described species. A review of *Apteromantis* can be found in BATTISTON, ORTEGO, CORREAS et CORDERO (2014). The new taxonomic system I propose, adopted for *Ameles* and *Parameles* in this work, is the following.

# Genus Ameles Burmeister, 1838

# Ameles (Ameles) Burmeister, 1838

## Ameles (Ameles) battistoni nomen novum

*= Pseudoyersinia maroccana* Battiston, Correas, Lombardo, Mouna, Payne et Schütte, 2018 nec *Ameles (Ameles) maroccana* Uvarov, 1931

Ameles (Ameles) gracilis (Brullé, 1838)

sub Mantis gracilis Brullé, 1838

Ameles (Ameles) maroccana Uvarov, 1931

# Ameles (Ameles) occidentalis (Bolívar, 1914) combinatio nova

sub Pseudoyersinia occidentalis Bolívar, 1914

# Ameles (Ameles) spallanzania (Rossi, 1792)

sub Mantis spallanzania Rossi, 1792

= Mantis nana Charpentier, 1825 synonymum novum

- = Mantis brevis Rambur, 1839 synonymum novum
- = Mantis soror Serville, 1839
- = Ameles abjecta africana Bolívar, 1914
- = Parameles modesta Bolívar, 1914
- = Ameles fasciipennis Kaltenbach, 1963 synonymum novum

*= Ameles spallanzania obscura* Battiston, Correas, Lombardo, Mouna, Payne et Schütte, 2018 **synonymum novum** 

#### Ameles (Canariameles) subgenus novum

Ameles (Canariameles) limbata (Brullé, 1838) sub Mantis limbata Brullé, 1838 = Ameles canaria Koçak & Kemal, 2008 Ameles (Canariameles) betancuriae (Wiemers, 1993) comb. nova sub Pseudoyersinia betancuriae Wiemers, 1993 Ameles (Canariameles) canariensis (Chopard, 1942) comb. nova sub Pseudoyersinia canariensis Chopard, 1942 Ameles (Canariameles) pilipes (Chopard, 1954) comb. nova sub Pseudoyersinia pilipes Chopard, 1954 Ameles (Canariameles) subaptera (Chopard, 1942) comb. nova sub Pseudoyersinia subaptera (Chopard, 1942) comb. nova sub Pseudoyersinia lindbergi Chopard, 1954 Ameles (Canariameles) teydeana (Chopard, 1942) comb. nova

#### Ameles (Pilosameles) subgenus novum

Ameles (Pilosameles) aegyptiaca Werner, 1913 Ameles (Pilosameles) persa Bolívar, 1911 = Ameles crassinervis Dirsch, 1927

Ameles (Apterameles) Beier, 1950 status restauratus et status novus
Ameles (Apterameles) arabica Uvarov, 1939
Ameles (Apterameles) confusa Morales Agacino, 1948 status novus
sub Ameles moralesi confusa Morales Agacino, 1948
Ameles (Apterameles) decolor (Charpentier, 1825)
sub Mantis decolor Charpentier, 1825
Ameles (Apterameles) dumonti Chopard, 1943
Ameles (Apterameles) heldreichi Brunner, 1882
= Ameles cypria Uvarov, 1936
= Parameles taurica (Jakovlev, 1903)

*Apterameles rammei* Beier, 1950 *Parameles shelkovnikovi* Bogatchov, 1946 *Ameles (Apterameles) kervillei* Bolívar, 1911 *Ameles (Apterameles) massai* Battiston et Fontana, 2005 *Ameles (Apterameles) moralesi* Bolívar, 1936 *Ameles (Apterameles) syriensis* Giglio-Tos, 1915 *Ameles (Apterameles) wadisirhani* Kaltenbach, 1982

Genus Parameles Saussure, 1869 status restauratus

Parameles (Parameles) Saussure, 1869 Parameles (Parameles) acuta species nova Parameles (Parameles) picteti Saussure, 1869 = Mantis assoi (Bolívar, 1873) synonymia restaurata

Parameles (Pseudoyersinia) Kirby, 1904 status novus

*Parameles (Pseudoyersinia) brevipennis (Yersin, 1860) comb. nova* sub *Mantis brevipennis* Yersin, 1860

Parameles (Pseudoyersinia) inaspectata (Lombardo, 1986) comb. nova

sub Pseudoyersinia inaspectata Lombardo, 1986

*Parameles (Pseudoyersinia) kabilica* (Lombardo, 1986) comb. nova sub *Pseudoyersinia kabilica* Lombardo, 1986

*Parameles (Pseudoyersinia) lagrecai* (Lombardo, 1984) comb. nova sub *Pseudoyersinia lagrecai* Lombardo, 1984

*Parameles (Pseudoyersinia) salvinae* (Lombardo, 1986) comb. nova sub *Pseudoyersinia salvinae* Lombardo, 1986

## Parameles (Stenameles) subgenus novum

*Parameles (Stenameles) melillensis* Bolívar, 1914 status novus sub *Parameles assoi melillensis* Bolívar, 1914 *Parameles (Stenameles) poggii* (Lombardo, 1986) combinatio nova sub *Ameles poggii* Lombardo, 1986

# Parameles (Leptameles) subgenus novum

*Parameles (Leptameles) andreae* (Galvagni, 1976) combinatio nova sub *Pseudoyersinia andreae* Galvagni, 1976

*Parameles (Leptameles) insularis* (Agabiti, Salvatrice et Lombardo, 2010) combinatio nova

sub Ameles insularis Agabiti, Salvatrice et Lombardo, 2010

*Parameles (Leptameles) paradecolor* (Agabiti, Salvatrice et Lombardo, 2010) combinatio nova

sub *Ameles paradecolor* Agabiti, Salvatrice et Lombardo, 2010 *Parameles (Leptameles) paui* (Bolívar, 1898) combinatio nova sub *Ameles paui* Bolívar, 1898

This is the taxonomic arrangement I will use in the following pages.

# The features

I will describe below the principal traits useful in the study of Amelini and discuss their use in the taxonomic arrangement of the tribe.

1) Vertex.

Vertex in Amelini is essentially of two types: either convex, that is elevated in the middle at least in a moderate median trait; or straight, or even concave, sometimes slightly elevated only in a short median trait. In the first case the convexity appears less accentuated in males for the high development of eyes that leads to a compression of lateral margins of vertex. Species of *Ameles* have a constantly convex vertex, which is a typical feature of this genus, but in some species with a "derived" habitus the convexity is less accentuated and limited to the ventral trait due to the very developed eyes (*Ameles pilipes, Ameles canariensis*). The straight vertex is a prerogative of genus *Parameles*, and also of *Apteromantis*. The real appearance of vertex can be appreciated only in a perfectly frontal view of the head.

Neanids at first stage of *Parameles* (examined species: *Parameles lagrecai*) have a straight vertex, like in the adult stage. In *Ameles* (examined species: *Ameles spallanzania*, *Ameles heldreichi*, *Ameles decolor*) the convexity of vertex is clearly visible already in the first stage.

## <u>2) Eyes</u>.

Shape of eyes varies widely, also within a same group of species. They could appear rounded, with a regularly arched margin, or be more or less distinctly angulated and assume an ovoid or conical shape. At the tip of the eyes there could be a tubercule, granule-shaped or conical. Rounded eyes are typical of some *Ameles* sensu stricto (*Ameles gracilis, Ameles maroccana, Ameles battistoni*) of *Ameles* (*Pilosameles*) aegyptiaca, of some *Ameles (Apterameles)* (*Ameles decolor, Ameles wadisirhani, Ameles confusa, Ameles massai, Ameles kervillei*), and reappear in *Parameles*, limited to the subgenus *Leptameles*. Ovoid or conical eyes are found in other *Ameles* sensu stricto (*Ameles spallanzania, Ameles occidentalis*), in *Ameles* (*Pilosameles*) persa, in many species of *Ameles (Canariameles*), in other species of *Ameles syriensis, Ameles moralesi*), and also in *Parameles* of nominal subgenus and *Parameles* (*Pseudoyersinia*). The presence of an apical tubercle is related to the degree of tapering of eyes. In *Apteromantis* eyes are always conical with an apical tubercle.

In neanids at first instar eyes are always ovoid with a small apical tubercle in *Ameles* (examined species: *Ameles spallanzania*, *Ameles heldreichi*, *Ameles decolor*), even in the species with rounded eyes at adult stage (*Ameles decolor*). In *Parameles* (examined species: *Parameles lagrecai*) neanids eyes seem to be more corresponding to the adult stage shape.

## 3) Pronotum.

Length to width ratios of pronotum have been used in the past for identification of species of this group (AGABITI, 2002; BATTISTON et FONTANA, 2005; AGABITI, SALVATRICE et LOMBARDO, 2010) and their usefulness has been discussed by OBERTEGGER et AGABITI (2012). I think that pronotal shape is a quite constant feature within subgenera of *Ameles* and is also quite uniform within the entire genus *Parameles*. In the latter it is always relatively elongated, with not well-marked supra-coxal dilatation and with prozona long at least 1.4-1.5 times its maximum width; in *Ameles* it is generally shorter, with more or less marked supra-coxal dilatations and with prozona generally less than 1.5 as long as its maximum width. In *Ameles (Apterameles)* and *Ameles (Canariameles)* pronotum appears relatively slender, with prozone clearly longer than wide and with margins not expanded in front of supra-coxal dilatations. In *Ameles (Ameles)* and *Ameles (Pilosameles)* pronotum is more robust, with prozone often almost as long as wide and with expanded margins in front of supra-coxal dilatations. In *Apteromantis* it is relatively long and slender, like in *Parameles*.

#### 4) Fore femora.

They appear quite constantly slender in *Parameles* and in *Apteromantis*, with a length/width ratio generally between 4 and 5. In *Ameles* femora are normally more robust. In *Ameles* (*Apterameles*) length/width ratio is about 3-3.9; in *Ameles* (*Pilosameles*) and *Ameles* (*Ameles*) it is on average a bit inferior, normally between 3 and 3.7; in *Ameles* (*Canariameles*) the shape of fore femora is very variable, maybe due to their geographical isolation that leads some species to have a "derived", peculiar appearance.

## 5) Walking legs pubescence.

Pubescence over median and hind legs has never been studied in-depth by Authors who have dealt with Amelini. I noted a certain constancy in the type of pubescence within species groups, so that feature was the principal used for the taxonomic arrangement in this article. In the genera *Parameles* and *Apteromantis* pubescence on walking legs is long, erect and of whitish colour, extended on femora, tibiae and tarsi. In Parameles (Pseudoversinia) it is particularly long and dense. In females it is shorter, darker and more decumbent, and on tibiae it is arranged in longitudinal lines. In Ameles pubescence changes depending on the subgenera. In Ameles (Canariameles) it is of a type similar to Parameles (long and extended on femora and tibiae in males, shorter and arranged in lines on the tibiae in females); in Ameles (Apterameles) it is of a type unique in Amelini because it is much reduced: it is almost absent on femora. and on tibiae of males it is quite short and quite inclined, arranged in longitudinal lines in the internal side; in females it is of the type seen in *Parameles*, with lines of short hairs; in Ameles (Pilosameles) pubescence is disposed as in Ameles (Apterameles) and in Parameles; in Ameles sensu stricto pubescence of male walking legs is quite reduced: on femora it appears erect and whitish, but it is scarce and very sparse, very much shorter than in Ameles (Pilosameles) and Ameles (Canariameles), and it is limited in the posterior margin; on tibiae it is long, erect and whitish (but shorter than in *Pilosameles* and *Canariameles*); females have pubescence of tibiae placed in lines, but in a more messy way than in other subgenera, with some hairs between a line and another. A considerable difference seen in Ameles (Apterameles) is that lines of hairs of female's walking legs tibiae are placed on a sort of slightly protruding keel-like ribs. In other subgenera of *Ameles* spines are disposed on lines but do not appear protruding in keels, if not just a little (except for ventral side). These weak carinae make hind tibiae have a more prismatic shape, with polygonal section, while in other subgenera they are more cylindrical. This feature can be observed only in dorsal view because in ventral view carinae are present in all subgenera.

The reduced public public of walking legs in *Ameles* (*Apterameles*) and *Ameles* (*Ameles*) seems to have evolved independently in the two subgenera. *Apterameles* seem to have a basal position compared to other subgenera for the more prismatic

mid and hind tibiae (observed also in *Parameles* and *Apteromantis*) and, in some cases, for the presence of abdominal lobes in females (observed also in *Litaneutria*), but the character is gradually lost in *Canariameles*, *Pilosameles* and *Ameles* sensu stricto. However it doesn't mean that a reduced pubescence is a basal feature: it has been probably lost later. In fact the basal condition of Amelini is the one noticed in *Canariameles* and *Pilosameles* (long pubescence extended on femora and tibiae of males), and also in *Parameles* and *Apteromantis*, suggesting that it was present in the common ancestor of these genera.

Length of hairs on walking legs of males, but not its density and disposition, seems to be influenced by ecological factors and by the lifestyle of every single species, appearing related to wings development. Brachypterous or apterous species even in males (some *Ameles (Canariameles), Parameles (Pseudoyersinia), Apteromantis)* have a constantly longer and more dense pubescence, maybe because the lack of functional flying organs forces them to a more ground-dwelling lifestyle, with the necessity of "touching" the surfaces above which they are located. Since the correlation short wings / longer pubescence is more evident in males than in females (which always have short and strong, less sensory hairs) it can be assumed that this character has the purpose of facilitating the search for a partner. A higher sensibility to the presence of females thanks to sensory hairs could compensate their poor ability to reach them in flight.

A similar pubescence could be observed outside Amelidae in the genus *Tarachodes* Burmeister, 1838 and in other related genera of family Eremiaphilidae. Although they are close families, it is quite sure that this fluff evolved independently in the two groups. It is interesting to notice that, unlike Amelini, in *Tarachodes* the long pubescence is present both in males and females. In this genus pubescence clearly has a tactile function related to the lifestyle of these insects, which in nature are usually in a position adhering to woods and barks.

## 6) Mid and hind femurs coloration.

An interesting feature I noticed is the presence of a pale transversal stripe on mid and hind femurs of some *Ameles*, totally absent in *Parameles* and *Apteromantis*. It can be seen in brown forms of the species, while it is normally absent in green or light brown forms (rarely visible also in green forms, such as in *Ameles persa*). In *Parameles* and *Apteromantis* the colour of mid and hind femurs is homogeneous or with the base or the tip of another colour.

In neanids at first instar of *Parameles* (examined species: *Parameles lagrecai*) this stripe is totally absent, while in *Ameles* (examined species: *Ameles spallanzania*, *Ameles heldreichi*, *Ameles decolor*) it is clearly visible.

#### 7) Flying organs.

Flying organs length has been used in the past to distinguish Amelini genera. This feature is very variable (even in the same species) as a result of environmental conditions. All species of *Ameles* from Canary Islands, except for *Ameles* (*Canariameles*) *limbata*, have reduced flying organs, which is a typical trait of insularism (long-distance travels are not necessary in small isles). Reduction of wings length is also observed in Moroccan *Ameles* (*Ameles*) such as *Ameles battistoni* and *Ameles occidentalis*, which probably are not phylogenetically related (the first has rounded eyes, the second conical). *Ameles maroccana* has also slightly shorter wings than normal. These continental populations have probably developed a wings reduction in response to lack of favourable habitats in the surrounding areas in the case of *Ameles occidentalis*, that lives in semi-desertic areas of western Morocco, or due to fewer contacts with competitors (such as *Ameles spallanzania*) in the case of *Ameles battistoni* and *Ameles maroccana*.

Wings and tegmina are reduced also in *Parameles (Pseudoyersinia)*, where they represent a constant feature of this monophyletic group. This subgenus is widespread in western Mediterranean basin, except for the westernmost part (Spain, Morocco) where no species have been described until now, with isolated stations (Provence, Sicily, Algeria). The flying organs reduction of this relatively widespread subgenus is hard to interpret but a possible answer should be searched in correlation to a past wider distribution of this group.

*Ameles (Apterameles)* has always functional and very elongate wings, probably in relation to the scarcely developed publication on walking legs (see above about the correlation between wings length and abundance of publication).

In *Parameles* (*Parameles*) and *Parameles* (*Leptameles*) (except for *Parameles paui*) wings are developed in males but generally do not reach the tip of abdomen or exceed it only a bit. In *Parameles* (*Leptameles*) *paui* flying organs are reduced but not much, that is a possible consequence of incomplete development observed in other *Leptameles*, which induces a lower fly tendency.

## 8) Female abdomen.

Abdomen of females could vary its shape a lot within this group. In *Parameles* and *Apteromantis* it is always quite slender and with sub-parallel sides. Central tergites are normally less than twice wider than long. In *Ameles (Apterameles)* abdomen is quite slender, only a bit more robust than in *Parameles*, but in *Ameles (Canariameles)*, *Ameles (Pilosameles)* and *Ameles (Ameles)* there is a tendency in increasing abdominal robustness. In *Ameles (Ameles)* abdomen is very robust, with transverse central tergites (about 4 times wider than long in some species) and lack of lateral sulci on them. In *Ameles (Ameles) spallanzania* abdomen is kept curved upwards in alive specimens. *Ameles (Ameles) gracilis* has a bit thinner abdomen and shows lateral sulci on tergites, so it probably has a basal position

with respect to the other species of this subgenus. In some *Ameles* (*Canariameles*) abdomen is very robust, which can be the effect of geographical isolation.

In some species females show a series of small median expansions in the posterior margin of tergites. These expansions are observed in *Ameles (Apterameles) moralesi, Ameles (Apterameles) confusa, Ameles (Apterameles) dumonti* and in *Ameles (Apterameles) kervillei.* 

Presence of small lobes on tergites in some species of *Apterameles*, probably the most plesiomorphic subgenus of *Ameles* (see above about longitudinal keels on mid and hind tibiae), could be interpreted as a plesiomorphic feature shared with neartic genus *Litaneutria* (Litaneutrini), subsequently reduced in *Parameles* and in other subgenera of *Ameles*.

Presence or absence of lateral longitudinal sulci on female tergites is another helpful feature in some cases. These sulci are generally reduced in *Ameles* (practically absent in *Ameles* (sensu stricto)), disappearing in the apical part. In *Parameles* lateral sulci are generally distinct and complete, with the exception of two species of subgenus *Leptameles* (*Parameles paradecolor, Parameles paui*) where they are less distinct.

The study of the abdomen structure is possible only with completely extended segments.

## 9) Cerci.

Cerci are barely shorter in *Ameles* than in *Parameles* and *Apteromantis*. In *Ameles* almost all segment are cylindrical and transverse (except for the tip), while in *Parameles* and *Apteromantis* the last third of each cercus has longer than wide and flattened segments. In non-dissected males cerci exceed the apical margin of subgenital plate in *Parameles* and *Apteromantis*, while in *Ameles* they do not exceed or exceed it just a little. Some exceptions are *Ameles* (*Apterameles*) *heldreichi*, that shows quite elongate cerci in males exceeding sub-genital plate, and *Parameles* (*Leptameles*) *paui*, with cerci of males exceeding a little the sub-genital plate.

# 10) Male genitalia.

I found two main features in male genitalia that could be adopted in taxonomy of this group: distal process of ventral phallomere and phalloid apophysis of left phallomere.

Distal process is divided in two teeth by a more or less deep incision in all known Amelinae. The shape of these teeth and incisions is important to recognize subgenera and species but there are not constant differences between genera. In *Parameles* the shape of distal process is quite homogeneous: incision not so deep and triangular and slightly acute teeth, similar in size. In *Ameles* the shape of distal process changes depending on subgenera: in more primitive subgenera

(Apterameles, Canariameles, Pilosameles) teeth are similar in shape, not deeply divided, and the lower margin is more or less sinuate. It is interesting to note that distal process of Pilosameles is almost identical to that of some Apterameles (such as Ameles heldreichi), while its external features are almost identical to those of Ameles (sensu stricto). In Ameles (Ameles) distal process is deeply divided in two triangular teeth, with the upper one thinner and the lower one slightly acute, with its inferior margin not sinuate. In Apteromantis distal process is similar to Ameles (Ameles) (but with more sinuate lower margin). This similarity is probably given by convergence.

Phalloid apophysis is an important feature for genera recognition. In *Parameles* and *Apteromantis* it is more sclerotized and less cylindrical. In *Ameles* it is more cylindrical and often slightly sclerotized. In *Ameles* (*Pilosameles*) phalloid apophysis is more sclerotized than in other subgenera, and spine-like. In *Parameles* the tip of phalloid apophysis is always divided by an incision that generates two small teeth. The lower tooth is reduced in *Parameles* (*Leptameles*). In *Apteromantis* phalloid apophysis has a pointed apex and a sinuate margin.

The basal condition of Amelidae is probably represented by a scarcely sclerotized phalloid apophysis. In Litaneutrini the anterior part is not sclerotized, while in Amelini it is clearly sclerotized and darkened. A more sclerotized and depressed phalloid apophysis is developed in a *Parameles* + *Apteromantis* clade (and independently in *Ameles* (*Pilosameles*), but in a different way), while in *Ameles* it remains often weakly sclerotized. A scarcely divided phalloid apophysis of *Parameles* (*Leptameles*), in some way more similar to the *Apteromantis* condition, suggests a basal position of this subgenus in *Parameles*.

## Biogeography

It is interesting that the recognized subgenera show well defined chorologies which are only partially overlapping. *Parameles* and *Apteromantis* are exclusively western Mediterranean: *Parameles (Parameles)* is widespread in Iberian Peninsula and North Africa; *Parameles (Leptameles)* has as well an Iberian distribution, with the "*Parameles andreae* complex" extending to Balearic Islands and Sardinia; *Parameles (Pseudoyersinia)* has a disjoint distribution with 1 species in Provence, 1 in Sicily and 3 in a restricted area of northern Algeria; *Parameles (Stenameles)* has as well a disjoint chorology with one species in north-western Libya and one in north-eastern Morocco; *Apteromantis* is widespread in Iberian Peninsula and in the Rifane area. *Ameles* has clearly North African-Middle Eastern origins, with some species extending to southern Europe: *Ameles (Ameles)* and 1 endemic species reaching Canary Islands, and a single species that extends its distribution in south-western Europe until western Balkan Peninsula; *Ameles (Pilosameles)* is

widespread in Middle East, with 1 species in north-eastern Egypt and 1 extending from Caucasus to Afghanistan; *Ameles (Canariameles)* is exclusively Canarian; *Ameles (Apterameles)* is extended from North Africa to south-central Europe and Levant, with the "*Ameles kervillei* complex" widespread from Morocco to Sicily and Jordan and the "*Ameles heldreichi* complex" present from north-east Africa and Levant to Balkan Peninsula, Italy, until eastern Pyrenees.

The Amelini probably originated in Western Mediterranean area (Maghreb, Iberian Peninsula), where there is a high number of taxa. A secondary diversification hotspot can be detected in the Middle East or North African area (probably impoverished by desertification), where species of *Ameles (Apterameles)* and *Ameles (Pilosameles)* originated.

The greatest barrier to spread of species of Amelini is the flying organs reduction of females. It generates manyof questions about the occurrence of some species in islands (Canary Islands, Balearic Islands, Sardinia, Corsica, Sicily, etcetera) because the spread of Amelini in these territories can only take place by land. Some islands have been connected with continental landmasses during positive eustatism periods, which, in relatively recent geological history are:

1) The Messinian salinity crisis (about 5 million years ago), when most of the Mediterranean sea was dry and this allowed the spread of some species into islands;

**2)** The positive eustatism during last Ice Ages (between about 1.8 million years ago and 10,000 years ago), when many islands were connected with their nearest landmasses, such as Corsica and Sardinia with Tuscany, Sicily with Calabria, many Aegean or Jonian islands with Greece or Turkey, Majorca and Menorca, etcetera.

The latter event is probably responsible for the presence of, for example, *Ameles decolor* and *Ameles spallanzania* in Corsica and Sardinia, of *Ameles heldreichi* in many Aegean Islands and of *Ameles dumonti* in Lampedusa island.

However, some chorologies are hard to interpret in my opinion. That is the case of the occurrence of *Ameles decolor* in Majorca and Menorca, but not in Formentera and in most Iberian Peninsula (except for the easternmost part). These two islands were connected during last ice age, and this justify the presence of *Ameles decolor* in both, but the more recent period when they were connected to the European continent is about 5 million years ago, during the Messinian salinity crisis. It is probably too long to show no signs of specific separation of the Balearic populations. Anthropic introduction is also an option.

An anthropic introduction, especially by boats, is responsible for the occurrence of Amelini in isolated volcanic islands, such as *Ameles spallanzania* in the Aeolian archipelago and *Ameles heldreichi* in some Aegean islands.

Amelini reached Canary Islands at least two times; the first with the Ameles

(*Canariameles*) subgenus, which generated many endemic species, and the second with *Ameles* (*Ameles*), with a single species (*Ameles gracilis*). The high level of differentiation between insular and continental species suggests a relatively ancient spread of Amelini in these islands, probably when Canary Islands were connected to Morocco. It would be interesting to verify this through genetic studies.

#### Taxonomy

Using the previously discussed features I provide the following key to distinguish *Ameles* and *Parameles*.

- Vertex of the head concave or straight (rarely slightly convex); pronotum generally thinner and longer (prozone generally more than 1.5 times longer than wide); fore femora normally thinner (generally more than 4 times longer than wide); female abdomen with median tergites (IV, V, VI) less transverse (less than twice wider than long, generally about as long as wide or longer than wide); cerci longer, with more flattened segments at least in males (longer than wide segments in the apical third or half); male genitalia with a generally well sclerified phalloid apophysis, posteriorly (apically) robust, a bit flattened, with the apex divided in two teeth (the lower one sometimes a little blunt).

Ameles Burmeister, 1838.

- = Mantis (Ameles) Burmeister, 1838.
- = Parameles Saussure, 1869; GIGLIO-Tos, 1927.

**Diagnosis**. Small size. Females with more or less robust appearance, males more slender. Vertex of the head convex. Pronotum short. Mid and hind tibiae more or less pubescent in males. Females brachypterous, males winged or brachypterous. Similar to *Parameles* but with convex vertex, stouter pronotum and fore femora, more robust abdomen of females and different male genitalia.

Redescription. Head with an arched vertex, more ore less convex (more convex

in females). Frontal sclerite pentagonal, with wide base and obtuse upper corner. Surface of frontal sclerite with two barely visible longitudinal carinae. Eyes quite developed (more developed in males), rounded, ovoid or conical, with or without an apical tubercle. Antennae filiform, longer in males.

Pronotum quite short, with metazone 2.5-1.5 times longer than prozone. Supracoxal dilatation well marked. Margin of pronotum thin, denticulate or not. Median carina of pronotum more ore less evident, often reduced apically. Fore coxae quite strong, of triangular section. Anterior margin of fore coxae with small teeth. Trochanters simple. Fore femora quite to very robust (generally 3-4 times longer than wide), with some longitudinal arched sulci. Claw-groove near the base of femur. Fore femora with 4 external and 4 (rarely 3) discoidal spines. Fore tibiae sulcate. Fore tarsi quite long, with first segment almost as long as the following segments taken together. Mid and hind legs long and thin. Hind femora a bit enlarged at their base. Mid and hind femora with a transversal stripe in dark specimens. Mid and hind tarsi short, with first segment about as long as the second. Tarsal segments more or less carinate, with small apical lobes in lower margin. Mid and hind legs covered or not by pubescence. Flying organs of females reduced, reaching or not first tergite. Tegmina of females drop-shaped, with quite distinct stigma. Wings of females with black anal area and reddish or orange discoidal area.

Abdomen of male normally thin, with segments not very transverse. Abdomen of females larger, more robust, with clearly transverse segments. Tergites of females often with lateral longitudinal sulci. Supra-anal plate triangular or rounded, with or without a dorsal carina. Sub genital plate simple in females. Sub genital plate of males ovoid, with short and thin styles. Cerci cylindrical, quite short, covered by setae. Ventral phallomere of male genitalia with distal process divided in a median and a lateral part by a more or less deep incision. Distal process left curved in ventral view. Right phallomere with two series of setae in its lower parts. Left phallomere with a weakly sclerotized and cylindrical phalloid apophysis, with acute or rounded apex. Long setae at the base of phalloid apophysis. Membranous lobe short.

**Remarks**. This new definition of *Ameles* clearly excludes some specie previously included in it and now placed in *Parameles*.

#### Key to subgenera

- Mid and hind tibiae of males with shorter and less erect pubescence disposed on

- **3** Male mid and hind femora with long and erect pubescence; female abdomen not particularly robust, with median tergites less than three times as wide as their length in rest position; male genitalia with distal process divided in two teeth by a less deep incision, with the upper one not so thin and the lower one with sinuate inferior margin; phalloid apophysis spur-like.

Male mid and hind femora without long and erect pubescence, clearly shorterthan on corresponding tibiae; female abdomen normally more robust, generally with median tergites more than three times as wide as long in rest position; male genitalia with distal process divided in two teeth by a deep incision, with the upper one much thinner and the lower one approximately triangular; phalloid apophysis curved, with rounded or acute apex.

## Ameles (Ameles) Burmeister, 1838

**Type species**: *Mantis nana* Charpentier, 1825 (=*Ameles spallanzania* (Rossi, 1792))

**Diagnosis**. Small size. Female robust, male more slender. Flying organs reduced in females, variable in males. Abdomen of the females strong. Fore femora robust. Pronotum short. Walking legs of male with long pubescence in the inner side of tibiae. Green to grey or brownish.

**Description**. Head with convex vertex. Eyes developed in both sexes, rounded or ovoid, generally without or with a small apical tubercle. Frontal sclerite pentagonal and quite transverse, with obtuse upper angle.

Pronotum robust, with well-marked supra-coxal dilatations. Margin of pronotum expanded above the supra-coxal dilatations. Prozone about 1.5-1.0 times longer than wide. Median carina of pronotum generally reduced on prozone, more or less visible on metazone. Fore coxae quite robust. Fore femora robust, about 3-3.7 times as long as wide, with 4 discoidal and 4 external spines. Fore tibiae carinate, relatively strong. Mid and hind legs quite slender. Mid and hind tibiae of female

covered by longitudinal stripes of aligned short pubescence, with some hair between the lines. Male tibiae with quite developed light and erect pubescence in the posterior margin. Mid and hind femora of male with sparse and quite short light pubescence on the posterior margin. Mid and hind tarsi short, with the first tarsomere about as long as the second. Tegmina of the female drop-like, with quite distinct stigma. Wings of the female with black anal area. Tegmina of male generally sub-hyaline. Wings hyaline or a bit darkened in species with reduced flying organs.

Abdomen of the female very robust; median tergites generally 3 times or more as wide as long. Male abdomen more slender, sub-parallel. Supra-anal plate triangular or rounded, generally with reduced median carina. Cerci shorts, cylindrical, covered by setae. Male genitalia with distal process divided by a deep and acute incision in two teeth: the upper one more slender, sub-parallel; the lower one robust, sub-triangular. Phalloid apophysis almost cylindrical, curved.

#### Ameles (Ameles) battistoni nomen novum

*= Pseudoyersinia maroccana* Battiston, Correas, Lombardo, Mouna, Payne et Schütte, 2018 (nec *Ameles maroccana* Uvarov, 1931)

**Examined material** (1 female). **Morocco**: 1 female from Ifrane, Parc National de, R707, 1400-1500 mt, legit Medvedev.

#### Distribution. Morocco.

**Remarks.** Clear affinities with species of *Ameles* induce me to include *Pseudoyersinia maroccana* in that genus. The species perfectly matches the description of *Ameles* given above but differs for the phalloid apophysis of male genitalia with a small tooth. The latter feature should not be considered homologous to the bidentate phalloid apophysis of true *Pseudoyersinia* shared with all *Parameles*, since it probably evolved in an independent way. In addition, this small tooth has been rarely observed in specimens of *Ameles spallanzania*.

The new name is dedicated to Roberto Battiston, Italian entomologist who devoted himself to the study of Mantodea, and first descriptor of *Pseudoyersinia maroccana*.

#### Ameles (Ameles) gracilis (Brullé, 1838)

#### Mantis gracilis Brullé, 1838

**Examined material** (4 specimens: 3 males and 1 female). **Canary Islands**: 3 males and 1 female from G. Canaria, La Pasadilla, 700 mt, 27.944155, -15.469143, legit D. Zeleny & P. F. Zeleny.

**Distribution**. Canary Islands.

Remarks. This endemic species of Canary Islands (La Palma, Tenerife, Gran

Canaria; Wieland, Schütte et Goldberg, 2014) differs from other *Ameles (Ameles)* for its marginally toothed and relatively longer pronotum and for less robust abdomen of females. Pronotum shows a prozone about 1.5 times longer than wide, while in other species it is normally shorter, but the anterior margin is clearly expanded (typical trait of *Ameles* sensu stricto). Female abdomen is less robust than in other species of the subgenus and still shows lateral sulci in tergites. Males show slightly reduced flying organs, which may be a consequence of geographical isolation.

## Ameles (Ameles) maroccana Uvarov, 1931

Ameles maroccana Uvarov, 1931

#### Distribution. Morocco.

**Remarks**. Characterized by rounded eyes and small ocelli. Males sometimes show a certain degree of brachyptery (BATTISTON et alii, 2018), not observed by MORALES AGACINO (1948) who described the male.

## Ameles (Ameles) occidentalis (Bolívar, 1914) combinatio nova

Pseudoyersinia occidentalis Bolívar, 1914

**Examined material. Museum photos.** 1 male (Holotypus) with the following data: "Agadir // Escalera", "Olotipo", "Ameles // occidentalis Bol.", "Ameles // occidentalis Bol. // (tipo)" (MNCN).

Distribution. Western Morocco (Agadir).

**Remarks**. Described as *Pseudoyersinia* for reduced flying organs. Male genitalia undoubtedly suggest it is a member of *Ameles* (*Ameles*) closely related to *Ameles spallanzania* and other Moroccan species. Short wings probably are independently evolved from the condition observed in another short-winged species, *Ameles battistoni*. Conical eyes are more like *Ameles spallanzania* ones.

## Ameles (Ameles) spallanzania (Rossi, 1792)

Mantis spallanzania Rossi, 1792

= Mantis nana Charpentier, 1825; KALTENBACH, 1963.

= Mantis brevis Rambur, 1839; UVAROV, 1948 (with Mantis nana).

= Mantis soror Serville, 1839; FINOT, 1895; EHRMANN, 2002.

*= Ameles abjecta africana* Bolívar, 1914; AGABITI, SALVATRICE et LOMBARDO, 2010.

= Parameles modesta Bolívar, 1914; AGABITI, SALVATRICE et LOMBARDO, 2010.

= Ameles fasciipennis Kaltenbach, 1963; synonymum novum

*= Ameles spallanzania obscura* Battiston, Correas, Lombardo, Mouna, Payne et Schütte, 2018; synonymum novum

Examined material (85 specimens: 49 males and 36 females). Crete (1 male): 1 male (and some nymphs) from "Crete". Croatia (1 female): 1 female from Peljesac peninsula, legit K. Kiss. Italian mainland (23 males and 21 females): 1 female from Orbetello (GR), legit V. V.: 1 male and 1 female from Carso Triestino, Medeazza (TS), legit Lucio Morin; 4 males and 7 females from Ferrara (FE), dint. stazione/ viale Po, IX-XI.2019, legit Marco Villani; 1 male from Lugo (RA), IX.2014, legit Marco Villani; 17 males and 11 females from Alfonsine (RA), legit Marco Villani; 1 female from Classe (RA), legit Marco Villani; 1 male from Policoro, legit G. Cancelliere". Sicily (2 males and 1 female): 2 males from Messina (ME), legit L. Padua; 1 female from Monreale (PA), 500 mt, legit L. R. Greco; Sardinia (15 males and 6 females): 1 male and 3 females from Monte Tonneri (CA), legit D. Sechi; 10 males from San Vito, San Priamo, legit D. Sechi; 1 female from Villaputzu Quirra, legit D. Sechi; 2 females from Quartu S. E., Niu Corbu, legit D. Sechi; 1 male from Burcei, Rio Ollastu, legit D. Sechi; 1 male from San Sperate, legit D. Sechi; 1 male from Lido del Sole, Olbia, legit G. Pezzi; 1 male from Le Vecchie Saline (OT), Baia Turchese, legit Marco Villani. France (5 females): 5 females from Hyeres, Costebelle, legit P. Coulon. Spain (7 males and 1 female): 1 male from Gerone, legit Miranda; 4 males, 1 female and 1 nymph from Píñar, rio, 1000 mt, legit P. M. Lopez; 1 male from "Grenada" (?Granada); 1 male from Los Alcornocales, A381, 200 mt, legit P. M. Lopez. **Portugal** (2 males and 1 females): 2 males from Guadiana U. B.: 1 female and 1 nymph from Évora, legit Medvedey. Museum photos. 1 male (holotypus of Ameles spallanzania obscura) with the following data: "Spain // Comares, el Esnite // UF 901 790 // 4.IX.2013 380m // Leg. K. Paine" and "Ameles // spallanzania // obscura // Holotypus" (MNCN). 1 male (syntypus of Ameles modesta) with the following data: "Haha a // Mtonga // 5 de Mayo", "Ameles // modesta Bol.", "Ameles modes- // ta Bol. // det. E. Morales Agacino", "Ameles // modesta Bol. // (tipo)" and "Sintipo" (MNCN). 1 female (syntypus of Ameles modesta) with the following data: "Haha a // Mtonga // 5 de Mayo", "Parameles // modesta Bolivar // det. Naskrechi 2004" (MNCN). 1 female (Holotypus? Lectotypus? Of Ameles africana) with the following data: "Msuda a // amismiz // Mayo // Escalera", "Holotipo", "Ameles // africana Bol. // det. E. Morales Agacino" and "Lectotipo".

**Distribution**. Widespread in west Balkan Peninsula (including Crete), Italy (including islands), France, Iberian Peninsula, Morocco, Algeria and Tunisia.

**Remarks**. See "Taxonomic notes on *Ameles spallanzania* and related taxa" for more information on this species.

In my opinion, the species *Ameles fasciipennis* Kaltenbach, 1963, known for only one male from Tolentino (Italy, Marche), is a synonym of *Ameles spallanzania*.

The reasons behind the synonymy are exposed below.

This species is exteriorly identical to *Ameles spallanzania*, although its copulatory organ is completely different: distal process is deeply incised, with two thin teeth, and the phalloid apophysis has long apical spine (the latter never observed in any species of *Ameles*). It is possible that *Ameles fasciipennis* is an extremely anomalous specimen of *Ameles spallanzania*, or the genitalia preserved do not belong to the pinned specimen.

An additional reason for which an endemic species could not exist in Tolentino is biogeographic: no hurdle exists or have existed in the past to justify the isolation and the speciation of an *Ameles* in this area, where the presence of two other species is well documented (*Ameles spallanzania* and *Ameles decolor*). Field investigations in the type locality did not lead to any result. It is worth to remember that Tolentino is placed in Marche interland and is not a peninsula (AGABITI, 2002; AGABITI, SALVATRICE et LOMBARDO, 2010) or placed in Apulia (as it appears to be in the map by AGABITI, SALVATRICE et LOMBARDO, 2010).

## Taxonomic notes on Ameles spallanzania and related taxa.

## Taxonomic notes on Mantis abjecta and Mantis spallanzania.

The taxonomy of *Mantis abjecta* Cyrillo, 1787, *Mantis spallanzania* Rossi, 1792 and some related taxa has been largely misinterpreted by several Authors in the past. In particular, it is not clear the real aspect of *Mantis abjecta*, known for a single figure in the original description (the type is lost). According to EHRMANN (2002) it could be a synonym of *Mantis decolor* Charpentier, 1825. In AGABITI (2002) it is considered a *species inquirenda* because its real appearance cannot be argued from the original figure. In BATTISTON et alii (2010) it becomes a synonym of *Mantis spallanzania*, which is incorrect according to the International Code of Zoological Nomenclature because *Mantis abjecta* has been described 5 years before *Mantis spallanzania*, and should have priority.

The holotype of *Mantis abjecta* comes from Campania (Italy) and it clearly represents a species of actual *Ameles*. In this region live two species of *Ameles*: *Ameles spallanzania* and *Ameles decolor*. The former has short pronotum, the latter a relatively longer one. It is impossible to known whether the holotype of *Mantis abjecta* has long or short pronotum, as the figure does not help.

More ancient Authors interpreted *Mantis abjecta* as a species with short pronotum, considering *Mantis spallanzania* a synonym of it. *Mantis spallanzania*, described from Etruria (Italy), is clearly a species with short pronotum as it can be argued from the figure of the original description. For several years all European *Ameles* with short pronotum were considered belonging to *Mantis abjecta* 

UVAROV (1948) for the first time put in doubt the identity of Mantis abjecta noting

that its real appearance cannot be appreciated in the figure by Cyrillus.

KALTENBACH (1963) too was in doubt about the real appearance of *Mantis abjecta* and applied the name *Mantis spallanzania* to the European *Ameles* with short pronotum.

The correct taxonomic status of *Mantis abjecta* should be "nomen dubium", not "species inquirenda" as in AGABITI (2002), because the holotype is lost and it cannot be argued to which species it corresponds.

# Taxonomic notes on Mantis nana and Mantis brevis.

*Mantis nana* has been largely misinterpreted by several Authors in the past starting from Rambur and after Fischer.

CHARPENTIER (1825) describes *Mantis nana* from Lusitania and writes that it has very short pronotum. RAMBUR (1839) for the first time recognizes *Mantis nana* as a species with relatively elongated pronotum (clearly visible in the figure), corresponding to *Parameles picteti* of SAUSSURE (1869), which has actually an elongated pronotum. After comparison with this misinterpreted *Mantis nana*, Rambur describes *Mantis brevis*, which actually is a species with short pronotum.

Following Rambur, GIGLIO-TOS (1927) considers *Parameles picteti* a synonym of *Mantis nana*. The biggest problem is that many Authors have based their idea of *Mantis nana* on that of Rambur. Giglio-Tos considers also *Mantis brevis* a species with long pronotum, quite similar to *Mantis nana*, but sincerely I do not know his reasons (in the figure of the original description this species clearly has a very short pronotum).

UVAROV (1948) correctly identifies *Mantis nana* as a species with short pronotum after seeing a photo of the holotype. After clarification of Rambur's misunderstanding, he recognizes *Mantis brevis* as a synonym of *Mantis nana* after comparison with the holotype.

KALTENBACH (1963) correctly considers *Mantis nana* a synonym of *Ameles spallanzania*.

Further Authors have never studied the *Mantis nana* problem and some of them (AGABITI, 2002; BATTISTON et alii, 2010) continued to consider *Mantis nana* as a species with long pronotum. In AGABITI, SALVATRICE et LOMBARDO (2010) *Mantis nana* is listed within synonyms of *Mantis spallanzania*.

In conclusion, *Mantis nana* and *Mantis brevis* are the same species, which has a very short and robust pronotum, at the moment included in *Ameles (Ameles)* and probably a synonym of *Mantis spallanzania*.

About synonyms of Mantis spallanzania.

These are the names applied to Mantis spallanzania in the past.

Non-Iberian taxa: *Ameles abjecta africana* Bolívar, 1914 (Morocco); *Parameles modesta* Bolívar, 1914 (Morocco); *Mantis soror* Serville, 1839 (Marsiglia, Sicily.).

*Mantis soror* has been considered a synonym of *Mantis spallanzania* by FINOT (1895) but GIGLIO-TOS (1927) rehabilited it, citing highly variable differential features. Now it is considered a synonym.

*Parameles modesta* has been considered a valid species until few years ago (AGABITI, 2002; BATTISTON et FONTANA, 2005; BATTISTON et alii, 2010). AGABITI, SALVATRICE et LOMBARDO (2010) recently established the synonymy of *Ameles modesta* with *Ameles spallanzania*.

Iberian taxa:

Mantis nana Charpentier, 1825 (Lusitania); Mantis brevis Rambur, 1839 (Grenada); Ameles spallanzania obscura Battiston et alii, 2018 (Comares, El Esnite).

These names are applied to Iberian populations of *Ameles* with short pronotum. In my opinion, they all belong to the same species (which should be *Mantis nana* for priority rule) but it is unclear whether it is a synonym of *Mantis spallanzania*. Morphological differences are discussed below.

I have examined specimens of *Ameles spallanzania* from Iberian Peninsula, and found that length of flying organs is quite variable but on average shorter than in North African and Central-South European populations, and wings colour is constantly more or less darkened, while in non-Iberian populations it is transparent. All Iberian specimens seem to belong to a single but quite variable taxon but it is unclear whether it is distinct from other populations of *Ameles spallanzania*. In this case, it should take the name of *Ameles nana* (Charpentier, 1825), described from Portugal, with *Mantis brevis* and *Ameles spallanzania obscura* as synonyms. It is interesting to note that this taxon is exclusively present in the Iberian Peninsula, while in North Africa, from Morocco to Tunisia, it is replaced by typical *Ameles spallanzania*, also present in southern Europe from France to Greece.

I have examined a large series of *Ameles spallanzania* from different countries and found some specimens with relatively shortened wings in Greece and France too. A male from Crete has partially darkened hind wings. For this reason I decide to consider *Mantis nana* (with *Mantis brevis* and *Ameles spallanzania obscura*) synonyms of *Ameles spallanzania*. Partial wings reduction of some Spanish males could be induced by environmental conditions during past isolation periods. BATTISTON et alii (2018) distinguish *Ameles spallanzania obscura* from other Spanish *Ameles spallanzania* for shorter wings and smaller ocelli but these features appear very variable.

In conclusion:

1 – *Mantis abjecta* could not be a synonym of *Mantis spallanzania* because it has been described before it;

**2** – real appearance of *Mantis abjecta* cannot be known due to an insufficient description and loss of the holotype, therefore it is not a *species inquirenda* as suggested by AGABITI (2002): it should be considered a *nomen dubium*;

**3** – *Mantis nana, Mantis brevis* and *Ameles spallanzania obscura* are the same species, widespread in Iberian Peninsula and characterized by barely shorter and darker wings in males;

**4** – the features of the latter Iberian taxa are variable and not sufficient to justify a species-level (or subspecies-level) distinction, so in my opinion these taxa are synonyms of *Mantis spallanzania*.

Consequently, I propose the following taxonomic changes:

Mantis abjecta Cyrillus, 1787 nomen dubium;

*Mantis nana* Charpentier, 1825 = *Ameles spallanzania* (Rossi, 1792) (confirmed synonymy)

*Mantis brevis* Rambur, 1839 = *Ameles spallanzania* (Rossi, 1792) (confirmed synonymy);

*Ameles spallanzania obscura* Battiston, Correas, Lombardo, Mouna, Payne et Schütte, 2018 = *Ameles spallanzania* (Rossi, 1792) synonymum novum.

Ameles (Pilosameles) subgenus novum

Type species: Ameles persa Bolívar, 1911

**Diagnosis**. Small size. Quite robust species. Eyes ovoid or rounded, sometimes a bit angulated apically. Female brachypterous (tegmina about as long as pronotum). Male fully winged (flying organs exceed abdomen apex). Mid and hind legs of males covered by long, pale and dense erect pubescence. Abdomen of females

robust. Colour green, brown or grey. Similar to *Ameles* (sensu stricto) but with more pubescent male walking legs, less robust female abdomen and different male genitalia.

**Description**. Head with convex vertex. Eyes well developed, ovoid or rounded, without a distinct apical tubercle, more rounded in females. Frontal sclerite pentagonal and transverse.

Pronotum short and robust, with distinct supra-coxal dilatations. Prozone a bit longer than wide. Margin of pronotum a bit expanded in front of supra-coxal dilatations. Median carina of pronotum quite visible but not distinct. Margin of pronotum smooth. Fore coxae quite robust. Fore femora robust, not distinctly sulcate, with 4 external and 4 discoidal spines. Fore tibiae quite slender and sulcate. Mid and hind legs quite long and slender. Mid and hind tibiae often with a transversal pale stripe in the middle. Mid and hind femora and tibiae of males covered by pale, long, erect and dense pubescence. Mid and hind femora and tibiae of females with shorter pubescence, disposed on longitudinal lines on tibiae. Tarsi of walking legs short, with first segment about as long as the second. Flying organs of females reduced, with tegmina about as long as pronotum, covering the first abdominal segment. Hind wings of females with black anal field and orange-reddish discoidal field. Males fully winged, with developed flying organs exceeding abdominal apex. Tegmina not completely covering wings in rest position. Tegmina of males sub-hyaline, wings mostly hyaline.

Abdomen quite robust in females, with a longitudinal median stripe and with lateral longitudinal sulci on tergites. Median tergites of females about 3 times wider than long. Abdomen more slender in males, with sub-parallel sides. Supraanal plate quite short and rounded. Cerci short, cylindrical, covered by setae. Male genitalia with distal process divided in two robust teeth by a weak and quite rounded incision. Phalloid apophysis spur-like, cylindrical, acute.

**Remarks**. Only two Middle-Eastern species are known for this subgenus, both characterized by a dense pubescence on walking legs of male. Robustness of pronotum and fore femora make this genus resemble *Ameles* (*Ameles*), with which it probably form a monophyletic group. However *Ameles* (sensu stricto) has less extended pubescence on walking legs. Male genitalia, which I observed only in *Ameles persa*, are of the type of *Ameles* (*Apterameles*), with distal process divided in two short teeth by a weak incision. An interesting trait, unique inside Amelini, is the spur-like phalloid apophysis.

## Ameles (Pilosameles) aegyptiaca Werner, 1913

Ameles aegyptiaca Werner, 1913

Distribution. Described from Northern Egypt. Reported also for Palestine

#### (BODENHEIMER, 1937).

**Remarks**. I was not able to study any specimen of this species and its taxonomic position remains quite unclear. Unfortunately the male specimen of the Natural History Museum of London studied by AGABITI et al., (2010) lacks abdomen, so male genitalia weren't shown, but in the same article they wrote: "Middle and hind legs slender with dense long hairs". For this reason I place this species in *Pilosameles* because the only other species of this subgenus, *Ameles persa*, shows a similar dense pubescence on walking legs.

#### Ameles (Pilosameles) persa Bolívar, 1911

Ameles persa Bolívar, 1911

= Ameles crassinervis Dirsch, 1927; EHRMANN, 2011

**Examined material** (4 males). **Iran**: 4 males from Iran, Bushir city area, Daleki vill., 150 mt, 29°26'22.33"N, 51°18'20.01"E, legit S. Demientev. **Museum photos**. 1 male (syntypus) with the following data: "Persia // Kouh Sefid // Haut Karoum // VII.1899 Escalera", "Ameles // persa Bol. // (tipo)", "Ameles // persa Bol. // Det. E. Morales 1989" and "Sintipo" (MNCN). 1 female (syntypus) with the following data "Persia // Chimbar" and "Sintipo" (MNCN).

**Distribution**. This species is widespread in Middle East, from Caucasus to Iran, Turkmenistan and Afghanistan, so it is the easternmost known species of Amelini.

**Remarks**. *Ameles persa* differs from *Ameles aegyptiaca* in having ovoid and angled eyes.

#### Ameles (Canariameles) subgenus novum

Type species: Mantis limbata Brullé, 1838

**Diagnosis**. Small size. Quite robust to slender species. Eyes developed, rounded, ovoid or conical, with or without an apical tubercle. Female brachypterous, sometimes with scarcely visible flying organs. Males winged to micropterous. Walking legs of males covered by long and erect pubescence. Colour from green to brown or grey. Similar to *Apterameles* for relatively slender pronotum but easily distinguishable for pubescent walking legs of male and for smooth surface of mid and hind tibiae, without distinct longitudinal dorsal carinae. Similar also to *Ameles* (sensu stricto) but with less robust pronotum and different male genitalia.

**Description**. Head with convex vertex. Eyes well developed, from rounded to slightly conical, with or without an apical tubercle. Frontal sclerite pentagonal, transverse.

Pronotum relatively slender, with not well marked supra-coxal dilatations. Margin of pronotum smooth. Median carina of pronotum visible. Fore coxae relatively robust. Fore femora from quite slender to robust, with four external and four discoidal spines. Fore tibiae quite slender and sulcate. Mid and hind legs slender. Mid and hind femora generally with a pale transversal stripe in brown or grey specimens. Walking legs covered by long, pale and erect pubescence in males. Females tibiae with lines of short and dark pubescence. Mid and hind tarsi short, with first segment as long as the second. Wings of females short (sometimes tegmina are very reduced and do not cover wings). Hind wings of females with black anal field and orange, yellowish or brown, sometimes very reduced. Flying organs of males variable in light: from completely developed to very reduced. Males tegmina sub-hyaline. Hind wings of males a bit darkened in species with reduced flying organs.

Abdomen quite to very robust in females, with small lateral longitudinal sulci. Median tergites 3-5 times wider than long in females. Abdomen more slender and with sub-parallel sides in males. Supra-anal plate triangular with rounded apex. Cerci quite short in both sexes. Male genitalia with distal process divided in two quite robust teeth by an angulated incision. Phalloid apophysis cylindrical, curved.

**Derivatio nominis**. The name of this new subgenus refers to the land of origin of all the species belonging to it, the Canary Islands.

**Remarks**. A similar shape of pronotum and type of pubescence on walking legs of males seems to support the monophyly of this endemic Canarian subgenus. *Canariameles* was probably originally widespread in continental Africa, from where it reached Canary Islands, and later it became extinct in the continent. Almost all the species has brachypterous males, which is a typical consequence of insular isolation. Only *Ameles limbata* is completely winged. In *Ameles teydeana* the wings reduction is less expressed and other features make it resemble to *Ameles limbata*. It is possible that brachyptery of *Ameles teydeana* derives from the condition of *Ameles limbata*, while other species (*Ameles canariensis, Ameles pilipes, Ameles subaptera* and *Ameles betancuriae*) represents a distinct monophyletic clade that evolved brachyptery independently. For this reason it is not clear if all the Canarian *Canariameles* derive from a single species that reached Canary Islands from Africa.

Male genitalia of this group should be studied in further works. I was able to examine only genitalia of a male of *Ameles limbata* (which were also a bit damaged) and their morphology is quite different to the other subgenera but in some sense similar to *Ameles* and to *Apterameles*.

## Ameles (Canariameles) limbata (Brullé, 1838)

Mantis limbata Brullé, 1838

= Ameles canaria Koçak & Kemal, 2008; WIELAND, SCHÜTTE et GOLDBERG, 2014

**Examined material** (2 specimens: 1 male and 1 female). **Canary Islands**: 1 male from "Tenerife"; 1 female from Tenerife, Palomas, c. de la Esperanza, 1600-1650 mt, *Pinus canariensis* forest, legit Santos & Medvedev.

**Distribution**. Recorded for La Palma and Tenerife (WIELAND, SCHÜTTE et GOLDBERG, 2014). Recorded also for Gran Canaria (CHOPARD, 1942; 1954).

## Ameles (Canariameles) betancuriae (Wiemers, 1993) combinatio nova

Pseudoyersinia betancuriae Wiemers, 1993

**Examined material. Museum photos.** 1 female (holotype) with the following data: "Islas Canarias: // Fuerteventura: // Bco.de Ajuy // 400m NN, 26.II.1991 // M. Wiemers leg." (Forschungsmuseum Alexander Koenig, Bonn, Germany, specimens.mantodearesearch.com).

**Distribution**. Described from Fuerteventura. The specimens recorded from Lanzarote could belong to this species (WIELAND, SCHÜTTE et GOLDBERG, 2014). PÉREZ, MORALES, OROMÍ et LÓPEZ (2003) reported this species from the island of Montaña Clara.

*Ameles (Canariameles) canariensis* (Chopard, 1942) combinatio nova

Pseudoyersinia canariensis Chopard, 1942

**Distribution**. Described for La Palma but also reported for Tenerife (BLAND, GANGWERE et MORALES MARTÍN, 1996). The presence of this species in Tenerife is questionable.

Ameles (Canariameles) pilipes (Chopard, 1954) combinatio nova

Pseudoyersinia pilipes Chopard, 1954

**Distribution**. Endemic to La Gomera.

**Remarks**. The relatively slender body, the barely robust fore femora and the slightly convex vertex make this species resemble to *Parameles* but I am persuaded to include it within this genus and subgenus due to its short cerci. Unfortunately I was not able to obtain any specimen of this rare species to confirm its taxonomic position. The species is carefully described in KALTENBACH (1979).

Ameles (Canariameles) subaptera (Chopard, 1942) combinatio nova

Pseudoyersinia subaptera Chopard, 1942

= *Pseudoyersinia lindbergi* Chopard, 1954; GANGWERE, MORALES MARTIN et MORALES AGACINO, 1972; KALTENBACH, 1979

**Examined material** (3 females). **Canary Islands**: 3 females from G. Canaria, La Pasadilla, 700 mt, 27.944155, -15.469143, legit D. Zeleny & P. F. Zeleny.

**Distribution**. Recorded for Gran Canaria and Tenerife (WIELAND, SCHÜTTE et GOLDBERG, 2014).

*Ameles (Canariameles) teydeana* (Chopard, 1942) combinatio nova *Pseudoyersinia teydeana* Chopard, 1942 **Distribution**. Endemic to Tenerife.

Ameles (Apterameles) Beier, 1950 status restauratus et status novus

Type species: Apterameles rammei Beier, 1950 (=Ameles heldreichi Brunner, 1882)

**Diagnosis**. Small size. Quite slender species, with almost cylindrical abdomen in females. Walking legs of males with quite short pubescence. Females brachypterous. Males completely winged. Colour generally grey to brownish.

**Redescription**. Head with convex vertex. Eyes well developed, from rounded to slightly conical, with or without an apical tubercle. Frontal sclerite almost pentagonal, quite transverse, with obtuse upper angle.

Pronotum quite robust, with not particularly marked supra-coxal dilatations. Prozone generally 1.4-2 times as long as its maximum width. Median carina of pronotum generally reduced. Fore coxae quite robust. Fore femora relatively slender, more distinctly sulcate in males, with 4 external and 4 discoidal spines. Fore tibiae relatively slender, sulcate. Mid and hind legs quite long and slender. Femora with a transversal pale stripe in darker specimens. Mid and hind tibiae of females with longitudinal lines of pubescence, disposed on scarcely elevated carinae. Mid and hind tibiae of males with relatively short and inclined pubescence, disposed in the posterior margin on a longitudinal line. Mid and hind tarsi short, with the first tarsomere about as long as the second one. Tegmina of the females short and drop-like, with quite distinct stigma. Wings of females with black anal field and orange discoidal field. Tegmina of males sub-hyaline, sometimes with small dark spots on longitudinal veins. Male wings almost hyaline.

Abdomen of females quite slender, cylindrical, slightly enlarged in the middle. Median tergites not particularly transverse, generally about 2 times as wide as long, with lateral longitudinal sulci. Male abdomen more slender, with subparallel margins. Supra-anal plate generally triangular. Cerci short, especially in females, cylindrical, covered by setae. Male genitalia with distal process not deeply incised, generally with distinct but not elongate teeth. Phalloid apophysis cylindrical and curved.

**Remarks**. It's somehow ironic that the only existent available name for this group was *Apterameles* because, after this new interpretation of it, it is the subgenus that shows the highest development of flying organs in males. BEIER (1950) believed that its specimen of *Apterameles rammei* was an adult of a wingless species but it was simply a young nymph of *Ameles heldreichi*.

This genus is well characterized by the plesiomorphic feature of slightly carinate mid and hind tibiae, with short pubescence aligned on carinae. This trait, shared with other Amelini and Litaneutrini but lost in other subgenera of *Ameles*, justify a basal position of *Apterameles* in the genus.

A distinct group of North African/South Levantine species, the "Ameles kervillei complex", is placed within this subgenus. It is well characterized by some features: a series of dorsal lobes on tergites of females, generally a shorter pronotum, rounded apical lobes of segments of hind tarsi and more developed and thinner teeth of distal process of male genitalia. The species included in "Ameles kervillei complex" are Ameles kervillei, Ameles massai, probably Ameles wadisirhani, Ameles dumonti, Ameles moralesi, Ameles confusa and maybe also Ameles arabica (which however does not show distinct lobes on female abdomen). Unfortunately male genitalia are known only for Ameles massai and Ameles dumonti.

#### Ameles (Apterameles) arabica Uvarov, 1939

Ameles arabica Uvarov, 1939

Distribution. North-western Saudi Arabia.

**Remarks**. Affinities of this species are unclear. According to the original description, it is similar to *Ameles heldreichi* but differs in smaller size, shorter pronotum and structure of posterior tarsi (UVAROV, 1939). A shorter pronotum could make resemble this species to *Ameles kervillei*. KALTENBACH (1982) describes the female of *Ameles arabica* but he does not cite the presence of small lobes on tergites, which is a typical trait of *Ameles kervillei* complex. Nevertheless, *Ameles arabica* probably belongs to this complex for having the fist segment of hind tarsi with a rounded lobe at its apex, observed also in *Ameles wadisirhani* (KALTENBACH, 1982) and *Ameles dumonti*.

*Ameles (Apterameles) confusa* Morales Agacino, 1948 status novus *Ameles moralesi confusa* Morales Agacino, 1948 **Examined material**. **Museum photos**. 1 female (holotypus) with the following data: "Muley Rechid (Ulad Setut) // Melilla-Marruecos // Pardo Alca... [unreadable]", "Ameles moralesi // confusa Mor. Ag. // Det. E. Morales Agacino" and "Holotipo".

Distribution. Known for the type locality: Morocco, Muley Rechid.

**Remarks**. Described as a subspecies of *Ameles moralesi* Bolívar, 1936, for the moment I retain it should be considered a distinct species for the important feature of rounded eyes (ovoid with an apical tubercle in *Ameles moralesi*), which in other cases is used in a species level distinction. This species differs from *Ameles moralesi* and other species of *Ameles* in having more prominent vertex in the middle. This feature, clearly visible in the figure of the original description, can be observed in the female holotype and seems not to be caused by a deformation caused by the state of conservation. A feature that unite this species to *Ameles moralesi* is the presence of small tergal lobes. This feature could be observed also in *Ameles kervillei* and *Ameles dumonti*. Another interesting trait that lead me to separate *confusa* from *Ameles moralesi* is the relatively short and robust pronotum (shorter than tegmina, while in *Ameles moralesi* it is longer than tegmina).

## Ameles (Apterameles) decolor (Charpentier, 1825)

## Mantis decolor Charpentier, 1825

**Examined material** (20 specimens: 10 males and 10 females). **Croatia** (2 males and 2 females): 2 males and 2 females from Krk island, n. coast, legit L. Caoduro (ex ovo). **Italian mainland** (8 males and 8 females): 1 female from Carpignano S. (LE), dintorni; 1 male and 3 females from Alleste (LE), Serra Calaturo, legit Marco Villani; 2 males and 1 female from Sughereta di Pomezia (RM), legit F. Turchetti; 3 males and 3 females from San Severino Marche (MC), località Martinelli, legit Marco Villani; 2 males from San Severino Marche (MC), Stigliano Piede, legit Marco Villani.

**Distribution**. This species is present in south-eastern Spain, Balearic Islands, southern France (type locality), Corsica, Sardinia, peninsular Italy, Sicily, Malta and western Balkan Peninsula. AGABITI, SALVATRICE et LOMBARDO (2010) exclude the presence of this species in Spain, where only *Parameles paradecolor* should exists. However, I have identified some males of *Ameles decolor* from Eastern Spain (Gerona and Rabós) and from Balearic Islands. This species probably does not cohabit with *Parameles paradecolor*, with more southern distribution.

**Remarks**. Similar to *Ameles heldreichi* but with less ovoid eyes and different male genitalia.

#### Ameles (Apterameles) dumonti Chopard, 1943

**Examined material** (1 female). **Lampedusa island** (1 female): 1 female from "Lampedusa". **Museum photos**. 1 male (Holotypus) with the following data: "Museum Paris // Tunisia // Maknassy // C. Dumont 1927", "Type" and "Ameles // dumonti // Type Chop." (MNHN, www.mnhn.fr). 1 male (Paratypus) with the following data: "Museum Paris // Tunisie // Maknassy // C. Dumonti 1927", "novembre", "Paratype" and "Ameles // dumonti Chopard // ♂ Paratype" (MNHN, www.mnhn.fr).

**Distribution**. Described from Tunisia. Possibly present in Lampedusa. Reported also for Morocco.

**Remarks.** I know some specimens from Lampedusa and Sicily (S. Stefano di Quisquina (AG); Agrigento) well corresponding to Ameles dumonti in their external and male genitalia morphology. These are the specimens that in BATTISTON (2004) and BATTISTON et FONTANA (2005) are reported as *Parameles picteti*. It is probably not the same species that RIGGIO et PAJNO (1886-1887) examined for the first records of *Parameles picteti* from Sicily; it is probable that these Authors have seen specimens of *Parameles lagrecai*. I also have examined a female of *Ameles* from Lampedusa similar to *Ameles decolor* but with angulate eyes and with small protruding lobes at the apex of tergites. It is possible that at least the Lampedusan specimens belong to Ameles dumonti. In fact, during last Ice Age, Lampedusa was connected with Tunisia, making probable the presence of the same species in those two areas. Male genitalia of the Lampedusan specimen are slightly different from those of *Ameles dumonti*, in shape of distal process, that could justify the description of these specimens as a new endemic species. The identity of Sicilian specimens is more unclear but they probably belong to an undescribed species similar to Ameles dumonti, from which they mainly differ for more developed apical tubercle of eyes and male genitalia.

*Ameles dumonti* has been reported also for Morocco (CHOPARD, 1942) but further Authors do not mention this record (BATTISTON et FONTANA, 2005; AGABITI, SALVATRICE et LOMBARDO, 2010) and mention only Tunisia. The identity of the Moroccan specimen is unclear (see above about *Ameles moralesi*).

#### Ameles (Apterameles) heldreichi Brunner, 1882

= Ameles cypria Uvarov, 1936; AGABITI, SALVATRICE et LOMBARDO, 2010.

= Parameles taurica (Jakovlev, 1903); HARZ et KALTENBACH, 1976.

= Apterameles rammei Beier, 1950; KALTENBACH, 1963.

= Ameles heldreichi forma minor Retowski, 1888; EHRMANN, 2011.

= Parameles shelkovnikovi Bogatchov, 1946; EHRMANN, 2011.

Examined material (12 specimens: 5 males and 7 females). Greek mainland (3

males): 3 males from Peloponnes, Mysteras, legit A. Maier. **Sporades** (1 male): 1 male from Sporades, legit Daniele Sechi. **Dodecanese** (1 male and 7 females): 1 male, 4 females and 2 nymphs from Kos island, Tigaki, legit Marco Villani; 3 females from Kos, Zia, legit Marco Villani.

**Distribution**. Widely widespread in southern Balkan Peninsula, in Ucraine, Crimea, south-western Russia, Levant, Egypt an Lybia.

**Remarks**. Similar to *Ameles decolor* but with more ovoid eyes and different male genitalia. Similar also to *Ameles syriensis*, which is probably a synonym.

## Ameles (Apterameles) kervillei Bolívar, 1911

## Ameles kervillei Bolívar, 1911

**Examined material**. **Museum photos**. 1 female (Holotypus) with the following data: "Anti-Liban, pres // de Baalbek (Syria).", "Ameles // kervillei Bol. // (tipo)", "Ameles // kervillei Bol. // Det. E. Morales 1989" and "Holotipo" (MNCN).

**Distribution**. This species is recorded for Jordan and Palestine (ABU-DANNOUN et KATBEH-BADER, 2007).

**Remarks**. In Jordan it cohabits with *Ameles massai*, that could be a synonym (AGABITI, SALVATRICE et LOMBARDO, 2010). *Ameles wadisirhani* from northern Arabia could be as well a synonym of *Ameles kervillei*.

*Ameles kervillei* shows a series of small lobes on tergites. This feature is shared also by *Ameles dumonti*, *Ameles moralesi* and *Ameles confusa*. All these species are part of a North African/South Levantine group, the "*Ameles kervillei* complex".

# Ameles (Apterameles) massai Battiston et Fontana, 2005

Ameles massai Battiston et Fontana, 2005

Distribution. Described from Jordan.

**Remarks**. Female unknown. According to AGABITI, SALVATRICE et LOMBARDO (2010) it is possibly a synonym of *Ameles kervillei*. The latter is recorded for localities about 50 kilometres north of stations of *Ameles massai*. Features shared by these two species are rounded eyes and shape of pronotum.

Male genitalia are of the same type of *Ameles dumonti*, which made part as well of the group of *Ameles kervillei*.

# Ameles (Apterameles) moralesi Bolívar, 1936

Ameles moralesi Bolívar, 1936

**Examined material**. **Museum photos**. 1 female (Holotypus) with the following data: "Sidi Ifni // (Ifni) // VI-1934 F. Escalera", "Tipo", "Holotipo" and "Ameles

mora- // lesi Bol. ♀ // Det. E. Morales Agacino" (MNCN).

Distribution. Western Morocco.

**Remarks**. Description is based on a single female. This species is closely related to *Ameles (Apterameles) dumonti*, described for Tunisia, also reported from Morocco, near the type locality of *Ameles moralesi* (El Aioun du Draa; CHOPARD, 1942). The specimen of *Ameles dumonti* reported for Morocco could be the male of *Ameles moralesi*; otherwise *Ameles moralesi* could be a synonym of *Ameles dumonti*, largely widespread from Morocco to Tunisia. These hypotheses could be confirmed only by examining other specimens of *Ameles moralesi*, which I was not able to see.

## Ameles (Apterameles) syriensis Giglio-Tos, 1915

Ameles syriensis Giglio-Tos, 1915

**Examined material**. **Turkey**: 2 females from Mardin, legit P. Crucitti, V. Vignoli, D. Fa...(unreadable).

**Distribution**. Known for Levant (Syria, Jordan and Anatolia) (AGABITI, SALVATRICE et LOMBARDO, 2010; DEMIRSOY, 1979; CIPLAK et DEMIRSOY, 1997), where it cohabits with *Ameles heldreichi*.

**Remarks**. This species differs from *Ameles heldreichi* in having more conical eyes with an apical tubercle (GIGLIO-TOS, 1927; AGABITI, SALVATRICE et LOMBARDO, 2010). I have examined some specimens of *Ameles* from Aegean Islands and Turkey that shows distinctly conical eyes with an apical tubercle, corresponding to the drawing of *Ameles syriensis* in AGABITI, SALVATRICE et LOMBARDO (2010). In the latter article male genitalia of these two species look almost identical. It is very likely that *Ameles syriensis* is a synonym of *Ameles heldreichi*.



**Figure 1**. A-G: head in frontal view of *Ameles* species. A: *Amele (Ameles) spallanzania* female; B: *Ameles (Ameles) spallanzania* male; C: *Ameles (Ameles) occidentalis* male; D: *Ameles (Canariameles) limbata* female; E: *Ameles (Canariameles) limbata* male; F: *Ameles (Apterameles) kervillei* female; G: *Ameles (Apterameles) confusa* female. H-R pronotum of *Ameles* species. H: *Ameles (Ameles) spallanzania* female; I: *Ameles (Ameles) spallanzania* male; J: *Ameles (Ameles) gracilis* female; K: *Ameles (Ameles) gracilis* male; L: *Ameles (Pilosameles) persa* female; O: *Ameles (Canariameles) limbata* male; N: *Ameles (Canariameles) limbata* female; O: *Ameles (Canariameles) limbata* male; N: *Ameles (Canariameles) limbata* female; O: *Ameles (Canariameles) limbata* male; P: *Ameles (Apterameles) kervillei* female; O: *Ameles (Canariameles) limbata* male; P: *Ameles (Apterameles) kervillei* female; O: *Ameles (Apterameles) moralesi* female; R: *Ameles (Apterameles) confusa*.



**Figure 2**. A-H: female abdomen (tergites II-VI) of *Ameles* species. A: *Ameles* (*Ameles*) *spallanzania*; B: *Ameles* (*Ameles*) *gracilis*; C: *Ameles* (*Pilosameles*) *persa*; D: *Ameles* (*Canariameles*) *limbata*; E: *Ameles* (*Apterameles*) *decolor*; F: *Ameles* (*Apterameles*) cf. *dumonti* (from Lampedusa), with lateral view; G: *Ameles* (*Apterameles*) *moralesi*; H: *Ameles* (*Apterameles*) *confusa*. I-J: male genitalia of *Ameles* species: I: *Ameles* (*Ameles*) *spallanzania*; J: *Ameles* (*Pilosameles*) *persa*.

#### Ameles (Apterameles) wadisirhani Kaltenbach, 1982

Ameles wadisirhani Kaltenbach, 1982

Distribution. Northern Arabia (Wadi Sirhan).

**Remarks**. The description is based on one male. As it can be argued from the original description and from the figure, this species is closely related to *Ameles kervillei*, of which it could be a synonym.

#### Parameles Saussure, 1869 status restauratus

#### Type species: Parameles picteti Saussure, 1869

**Diagnosis**. Small species. Slender body. Females brachypterous, males winged or brachypterous. Eyes developed, rounded, ovoid or conical, with or without an apical tubercle. Walking legs of males covered by long and dense pubescence. Similar to *Ameles* but with straight or concave vertex and bidentate phalloid apophysis of male genitalia.

**Redescription**. Vertex straight or concave, sometimes a bit convex in the middle trait. Eyes developed, rounded, ovoid or conical, with an apical tubercle. Frontal sclerite pentagonal, quite transverse.

Pronotum relatively slender and weak, with not well marked supra-coxal dilatations'. Prozone generally more than 1.5 times longer than wide. Median carina of pronotum visible but not distinct. Fore femora relatively slender, with longitudinal sulci. Fore femora with 4 external and 4 discoidal spines. Fore coxae quite slender, longitudinally sulcate. Fore tarsi quite long, with first segment about as long as remaining segment taken together or a bit shorter. Mid and hind legs slender. Mid and hind femora a bit enlarged at their base. Walking legs of males covered by dense, pale, long and erect pubescence. Walking legs of females with short and decumbent. Mid and hind tarsi short, with first segment as long as the second or slightly longer. Flying organs of females short, reaching or not the apical margin of first tergite in rest position. Tegmina of females drop-like. Wings of females with black anal field and orange discoidal field. Flying organs of males more or less developed. Tegmina sub-hyaline. Wings hyaline or sub-hyaline.

Abdomen quite slender, sub-cylindrical, generally with a median stripe. Female tergites a bit longer than wide, as long as wide or a bit wider than long, with complete lateral longitudinal sulci. Male abdomen more slender than in females, with sub-parallel margins. Supra-anal plate sub-triangular, with rounded apex. Cerci generally quite developed, with compressed and elongate apical segments. Male genitalia with distal process divided in two robust teeth by an angulate incision. Phalloid apophysis sclerotized, slightly compressed, with bidentate apex (the lower teeth could be reduced).

Observations. SAUSSURE (1869) distinguish Parameles from Ameles for having

conical eyes. This genus has been considered a synonym of *Ameles* by GIGLIO-Tos (1927) who has misinterpreted the latter (*Ameles nana*). Further Authors considered *Parameles* as well a synonym of *Ameles*. I have found some features that clearly distinguish this genus from *Ameles*. In addition, genus *Pseudoyersinia* is here recognized a subgenus of it for its very similar external and genitalia appearance. Shape of eyes, used by SAUSSURE (1869) should not be used anymore to distinguish genera. Two new subgenera are described below.

- Eyes perfectly rounded, apically not angled. .....Leptameles subgenus novum.

- Mid and hind tibiae of males with very long pubescence; mid and hind tibiae of females with quite short hairs, erect and whitish; hind tarsi of male covered by long pubescence; hind tarsi of females with quite long pubescence, quite abundant on the first segment; flying organs of males reduced, not reaching the tip of the first abdominal segment in rest position; flying organs of females reaching at most the mid of first abdominal segment in rest position.

......Pseudoyersinia Kirby, 1904.

#### Parameles (Parameles) Saussure, 1869

#### Type species. Parameles picteti Saussure, 1869

**Diagnosis**. Small size, slender appearance. Eyes ovoid or conical, with a more or less developed apical tubercle. Slender fore femora. Mid and hind legs of males covered by dense hairs. Males winged, females brachypterous. Colour green, brown or grey, with a longitudinal stripe on female abdomen. This subgenus is recognizable from the other for more conical eyes and more developed flying organs.

**Redescription**. Vertex straight. Eyes developed and protruding, ovoid or conical. Apical tubercle of eyes more or less developed.

Pronotum relatively slender, with not well marked supra-coxal dilatations. Prozone generally more than 1.5 times longer than wide. Median carina of pronotum not distinct. Margin of pronotum smooth. Fore femora relatively slender and slightly sulcate, with four external and 4 discoidal spines. Fore tibiae quite slender and sulcate. Mid and hind legs slender, with long, dense and pale pubescence in males. Mid and hind tarsi short, with first segment about as long as the second. Flying organs of female short, covering first abdominal segment and generally at least part of the second. Flying organs of male completely developed, generally covering almost all abdomen except fort apex or cerci. Wings of females with black anal field and orange-reddish discoidal field. Male wings hyaline.

Abdomen of females quite slender, with sub-parallel margins, more slender in males. Abdomen with a dorsal longitudinal stripe in females. Median tergites of females about as long as wide, with lateral longitudinal sulci complete and quite distinct. Supra-anal plate sub-triangular, with rounded apex. Cerci quite developed in females, generally reaching the tip of sub-genital plate. Cerci of males developed, exceeding apex of sub-genital plate, with elongate and compressed apical segments. Cerci covered by short hairs. Male genitalia with distal process divided in two barely acute teeth a quite weak and angulate incision. Phalloid apophysis quite robust, a bit compressed, with bidentate apex.

**Observations**. This subgenus is closely related to *Pseudoyersinia* but differs in more reddish antennae, more developed flying organs, shape of male genitalia and for shorter pubescence on male walking legs. Similar also to *Stenameles* but with thicker antennae and different male genitalia.

# Taxonomic notes on *Parameles picteti* Saussure, 1869, *Mantis assoi* Bolívar, 1873 and *Mantis nana* Charpentier, 1825.

*Parameles picteti* Saussure, 1869, *Mantis assoi* Bolívar, 1873 and *Mantis nana* Charpentier, 1825 have been misinterpreted by several Authors (GIGLIO-Tos, 1927; MORALES AGACINO, 1947; AGABITI, 2002; BATTISTON, PICCIAU, FONTANA et MARSHALL, 2010; AGABITI, SALVATRICE et LOMBARDO, 2010).

RAMBUR (1838) misinterpreted *Mantis nana*. According to UVAROV (1948), Rambur's specimens belong to *Parameles picteti*, while *Mantis nana* is a very different species.

GIGLIO-Tos (1927) synonymised *Parameles picteti* with *Mantis nana*, probably because he didn't know the real appearance of the latter. In the same work Giglio-Tos cites *Mantis assoi* (sub *Ameles assoi*) as similar to *Parameles picteti* and the only distinctive features provided are the supra-coxal expansions placed in the middle of pronotum.

UVAROV (1948) clarified that Mantis nana is a species with short pronotum (now

*Ameles* (sensu stricto), a synonym of *Ameles spallanzania*), while *Parameles picteti* has longer pronotum and belongs to a different group. He studied Rambur's specimens of "*Mantis nana*" and noted that they belong to *Parameles picteti*.

The remark by Uvarov has been overlooked by some Authors (AGABITI, 2002; BATTISTON, PICCIAU, FONTANA et MARSHALL, 2010) but in AGABITI, SALVATRICE et LOMBARDO (2010) this species is listed within synonyms of *Ameles spallanzania* (Rossi, 1792). In AGABITI (2002) *Mantis nana* (sub *Ameles nana*), without *Parameles picteti* as a synonym, is shown as a species with slender pronotum and distinctly conical eyes. In the same work, *Parameles picteti* (sub *Ameles picteti*) seems to have as well a slender pronotum but more ovoid eyes and *Mantis assoi* (sub *Ameles assoi*) is considered a synonym of it.

In AGABITI, SALVATRICE et LOMBARDO (2010) *Parameles picteti* (sub *Ameles picteti*) corresponds to the *Ameles nana* of AGABITI (2002) (same drawings) and *Mantis assoi* (sub *Ameles assoi*) is considered a valid species, corresponding to the *Ameles picteti* of AGABITI (2002) (same drawings). In this work the treatment of *Parameles picteti* and *Mantis assoi* is the same as in MORALES AGACINO (1947).

It is clear that in Iberian Peninsula two species of *Parameles* with ovoid/conical eyes are actually present: a species with ovoid eyes and blunt apical tubercle (*Ameles picteti* sensu GIGLIO-Tos, 1927; *Ameles (Parameles) assoi* sensu MORALES AGACINO, 1947, *Ameles picteti* sensu AGABITI, 2002; *Ameles assoi* sensu AGABITI, SALVATRICE et LOMBARDO, 2010) and a species with more distinctly conical eyes with a distinct apical tubercle (*Ameles (Parameles) picteti* sensu MORALES AGACINO, 1947; *Ameles nana* sensu AGABITI, 2002; *Ameles picteti* sensu MORALES AGACINO, 1947; *Ameles nana* sensu AGABITI, 2002; *Ameles picteti* sensu AGABITI, SALVATRICE et LOMBARDO, 2010).

I have seen male and female syntypes of *Parameles picteti* and this species clearly does not correspond to the *Ameles picteti* of AGABITI, SALVATRICE et LOMBARDO (2010) but it looks identical to the *Ameles assoi* of the same work. The true *Parameles picteti* has ovoid eyes with a blunt apical tubercle, while the species of AGABITI, SALVATRICE et LOMBARDO (2010) has distinctly conical eyes, with a triangular apical tubercle.

Unfortunately, I was not able to examine the female holotype of *Mantis assoi*. According to PARís (1993) it is probably lost, but AGABITI (2002) writes that she has checked it, without providing any data on its localization: within "Materiale esaminato" (=Examined material) the holotype female is not listed. PARís (in litteris) confirmed that the type of *Mantis assoi* is lost. However, I have seen two males of *Ameles assoi* from Madrid (type locality of the species) collected and identified by Bolívar in 1898 from the MSNG that should be considered for sure members of this species. In addition I have read the original description by BOLÍVAR (1873). The Author did not compare his species with the recently described *Parameles picteti*, probably because he was not aware of its existence. From the

description it could be argued that *Mantis assoi* is a synonym of *Parameles picteti*. The two males from MSNG have ovoid eyes with a very small apical tubercle and correspond to the male syntype of *Parameles picteti*. The position of supra-coxal dilatations is variable and could not be considered a valid feature as observed by AGABITI (2002), who rightly synonymized these two species. It is not clear why the same Authoress, with some other entomologists, changed her interpretation of these taxa in AGABITI, SALVATRICE et LOMBARDO (2010).

The second Iberian species, with more conical and tuberculate eyes, was recognized for the first time by MORALES AGACINO (1947), who confused it with *Parameles picteti* (sub *Ameles (Parameles) picteti*). As exposed above, the true *Parameles picteti* has ovoid and weakly tuberculate eyes and does not correspond to the species described and drawn by MORALES AGACINO (1947). This taxon has never been described before. It clearly does not even correspond to *Mantis assoi* for the following features (compared with those argued from the description of *Mantis assoi* and of the two males identified by Bolívar): vertex completely straight, not slightly convex; female abdomen with sub-parallel margins, not a bit enlarged in the median portion; eyes more distinctly conical (in the original description, eyes of *Mantis nana* are described as identical to those of *Mantis brevipennis*, which has ovoid eyes). In addition, type of *Mantis assoi* comes from Madrid, while the species with distinctly conical eyes has a more southern distribution in Spain (Andalucía).

I decide to confirm the synonymy, already proposed by AGABITI (2002) but later overlooked:

*Mantis assoi* Bolívar, 1873 = *Parameles picteti* Saussure, 1869 synonymia restaurata.

# Historical reconstruction of taxonomic changes and interpretations of *Parameles picteti* and related taxa.

- CHARPENTIER, 1825: describes Mantis nana;

- **BURMEISTER**, **1838**: describes *Mantis* (*Ameles*) with *Mantis nana* and three others species later included in other genera;

- **RAMBUR**, **1838**: misinterpretation of *Mantis nana* (wrongly considered a species with long pronotum);

- LUCAS, 1849: misinterpretation of *Mantis nana* following RAMBUR (1838);

- **FISCHER**, **1853**: correct interpretation of *Mantis nana* (synonym of *spallanzania*);

- SAUSSURE, 1869: describes Parameles picteti;

- SAUSSURE, 1871: Ameles (Parameles) picteti (Parameles subgenus of Ameles);

- BOLÍVAR, 1873: describes Mantis assoi;

- BOLÍVAR, 1898a: Mantis assoi transferred to genus Ameles;

- BOLÍVAR, 1898b: Parameles subgenus of Ameles; Mantis assoi within Parameles;

- JACOBSON et BIANKI, 1902: misinterpretation of *Mantis nana* following RAMBUR (1839);

- **KIRBY**, **1904**: *Parameles picteti* (*Parameles* distinct genus); *Mantis assoi* within *Parameles*; *Mantis nana* type species of *Ameles*;

- GIGLIO-TOS, 1927: Parameles picteti synonym of Mantis nana after misinterpretation of the latter following RAMBUR (1839); consequent synonymy of *Parameles* with Ameles; Ameles assoi valid species and Ameles assoi melillensis as a variety of it;

- **BEIER**, **1935**: *Parameles picteti* (sub *Ameles picteti*) synonym of *Mantis nana* (sub *Ameles nana*) (probably following GIGLIO-Tos, 1927)); *Ameles assoi melillensis* synonym of *Parameles assoi* (sub *Ameles assoi*);

- MORALES AGACINO, 1947: Parameles picteti (sub Ameles (Parameles) picteti) as a valid species but misinterpreted (corresponds to a undescribed species, Ameles acuta species nova); Mantis assoi (sub Ameles (Parameles) assoi) correctly interpreted; Mantis nana not cited;

- UVAROV, 1948: *Parameles picteti* correctly interpreted (considering it a species with long pronotum); *Mantis nana* correctly interpreted after examination of a photo of the type (considering it a species with short pronotum);

- EHRMANN, 2002: *Parameles picteti* (sub *Ameles picteti*) as a valid species; *Mantis assoi* (sub *Ameles assoi*) as a valid species with *Ameles assoi melillensis* as synonym;

- AGABITI, 2002: misinterpretation of *Mantis nana* (sub *Ameles nana*) (considering it a species with long pronotum; indeed it corresponds to an undescribed species) (see MORALES AGACINO, 1947); correct interpretation of *Mantis assoi* as a synonym of *Parameles picteti*;

- OTTE et SPEARMAN, 2005: Mantis nana valid species (sub Ameles nana) but not the type species of Ameles; Parameles picteti valid species (sub Ameles picteti); Mantis assoi valid species (sub Ameles assoi) and Ameles assoi melillensis valid subspecies;

- **BATTISTON et FONTANA, 2005**: misinterpretation of *Parameles picteti* (sub *Ameles picteti*) (confusion of Sicilian specimens of a different species belonging to the genus *Ameles*); *Mantis assoi* not cited;

- BATTISTON, PICCIAU, FONTANA et MARSHALL, 2010: interpretation of *Mantis* nana and *Parameles picteti* (with *Mantis assoi* as a synonym) as in AGABITI (2002);

- AGABITI, SALVATRICE et LOMBARDO, 2010: correct interpretation of *Mantis nana* (as a species with short pronotum), considered a synonym of *Ameles spallanzania*; *Parameles picteti* misinterpreted, its name applied to an undescribed species;

Mantis assoi resurrected from synonymy, valid species.

It is important to remark that *Mantis nana* is the type species of *Ameles*. OTTE et SPEARMAN (2005) identified *Mantis abjecta* as the type species of *Ameles* but this cannot be possible because it has been placed within *Ameles* about 59 years after the description of genus *Ameles* (BOLÍVAR, 1897). According to the International Code of Zoological Nomenclature, the type species must be chosen within the species originally included in the genus at the time of its description. KIRBY (1904) correctly interpreted *Mantis nana* as the type species of *Ameles* because it is the only species present in this genus at the time of its description excluding *Mantis minima*, *Mantis aurantiaca* and *Mantis flavicincta*, which had been transferred to other genera.

For sure *Mantis nana* is a species with short pronotum belonging to current *Ameles* (*Ameles*). In my opinion it is a synonym of *Ameles spallanzania*.

As explained above, the second Iberian *Parameles* (with more distinctly conical and tuberculate eyes), widespread also in North-West Africa, belongs to an undescribed species. It does not correspond to any taxon described for Western Mediterranean: *Mantis nana* (type locality: Lusitania) and *Mantis brevis* (type locality: Grenade) clearly belong to *Ameles* (*Ameles*) and should be considered synonyms of *Mantis spallanzania*; *Parameles picteti* is similar but differs in more ovoid eyes with more blunt apical tubercle and some other features explained in the description; *Parameles assoi melillensis* should be considered a valid species of a different subgenus.

I describe this new species here below.

## Parameles (Parameles) acuta species nova

Parameles picteti sensu Morales Agacino, 1947;

Ameles nana sensu Agabiti, 2002;

Ameles nana sensu Battiston et alii, 2010;

Ameles picteti sensu Agabiti et al., 2010.

**Examined material** (6 specimens: 4 males and 2 females). **Morocco** (1 male and 1 female): 1 male (Holotypus) from "Berkane prov., 30 km W Berkane, Moulouya river, 47 m, 34°54'02"N 2°38'34"W, 1.VII.2019, leg. I. Zappi", Marco Villani private collection (with the labels "Parameles acuta // Villani, 2020 // det. Marco Villani, 2020" and "Holotypus // Parameles acuta // Villani, 2020"); 1 female (Paratypus) from "E-Morocco, Lac Afred, Juin 78", Marco Villani private collection (with the labels "Parameles acuta // Villani, 2020  $\mathcal{Q}$  // det. Marco Villani, 2020" and "Paratypus // Parameles acuta // Villani, 2020"). **Spain** (1 male): 1 male (Paratypus) from "Malaga // 23.VIII.2017", Roberto Battiston private collection (with the labels "Parameles acuta // Villani, 2020").

and "Paratypus // Parameles acuta // Villani, 2020"). **Other verified material**. 1 male with the following data: "Oran !", "Ameles nana ... [unreadable]" (MNCN). 1 male with the following data: "(Oran)", "Algerie", "Ameles // nana (Charp)" (MNCN). 1 female with the following data: "Oran !" (MNCN).

**Diagnosis**. A *Parameles* with typical features of *Parameles* subgenus. Similar to *Parameles picteti* but with more conical eyes and different shape of male genitalia. Small size, slender body. Green, beige or brown colour.

**Description (male)**. Head with straight vertex. Eyes developed, sub-conical (slightly recurve sides), with a conical apical tubercle. Ocelli quite large. Frontal sclerite pentagonal and quite transverse, with obtuse upper angle. Frontal sclerite with two faint longitudinal carinae in the middle, more visible at the lower margin. Clypeus rhomboid, slightly divided by a superficial transversal carina in anticlypeus and postclypeus. Antennae reddish, filiform, relatively thickened and with transverse basal segments.

Pronotum relatively slender, 2.5-2.7 times longer than wide, with not well-marked supra-coxal dilatations. Margin of pronotum thin and smooth. Metazone about 1.5 times longer than prozone. Prozone about 1.5-1.6 times longer than wide. Median carina of pronotum reduced, barely visible. Fore coxae relatively slender. Inner side of fore coxae pale with two longitudinal brown/black stripes near the base. Fore femora slender, about 4.6-4.8 times longer than wide, with 4 external, 4 discoidal and 12 internal spines (arranged as follows: iIiIiIiIiIi). Fore tibiae more than half as long as fore femora, longitudinally carinate, with 9 external and 10 internal spines. Fore tarsi slender, with the first tarsomere about as long as the remaining segments taken together. Mid and hind legs slender. Femora and tibiae covered by a dense long, erect and light pubescence. Mid and hind tarsi short and pubescent, with the first tarsomere about as long as the second (segments III, IV and V barely shorter). Apical lobes of the tarsomeres triangular. Flying organs well developed, covering the abdomen except the terminalia. Tegmina sub-hyaline. Wings hyaline, a bit brownish at the apex and near the costal margin.

Abdomen slender, sub-parallel, with longer than wide median tergites and sternites. Supra-anal plate sub-triangular, apically rounded. Cerci quite elongated, flattened (especially at the apex), covered by setae. Cerci made up of about 15 segments, of which the I-VI clearly transverse, the VII-VIII about as long as wide and the IX-XV clearly longer than wide. Sub-genital plate sub-triangular with truncated apex, covered by sparse setae. Styli quite short and thin, covered by setae. Male genitalia with sub-rhomboid shaped ventral phallomere. Distal process quite sclerotized, divided in the median and lateral branch by an obtuse and tightly rounded incision. The two teeth generated are similar in length and shape, with the apical angle of about 90° and apically darkened. Right dorsal phallomere relatively slender, quite curved, with main body with two ventral series of short and bristly pubescence fused at the apex. Ventral plate of the right dorsal phallomere sclerified.

Ventral sclerified process well developed and sclerified, with at the base a lightly sclerotized area covered by dense pubescence. Left dorsal phallomere with subtriangular dorsal lamina, with short pubescence on the dorsal margin. Titillator slender, barely sinuose, with rounded and recurve apex. Phalloid apophysis robust and well sclerotized, with apex divided in two teeth of which the upper one is more developed and acute.

**Description (female)**. Head with straight vertex. Eyes developed, sub-conical (slightly recurve sides), with a conical apical tubercle. Ocelli small. Frontal sclerite pentagonal and quite transverse, with obtuse upper angle. Frontal sclerite with two faint longitudinal carinae in the middle, more visible at the lower margin. Clypeus rhomboid, slightly divided by a superficial transversal carina in anticlypeus and postclypeus. Antennae pale, filiform.

Pronotum relatively slender, 2.4-2.7 times longer than wide, with not well-marked supra-coxal dilatations. Margin of pronotum thin and smooth. Metazone about 1.5 times longer than prozone. Prozone about 1.5 times longer than wide. Median carina of pronotum reduced, barely visible. Fore coxae relatively slender. Inner side of fore coxae pale with two longitudinal brown/black stripes near the base. Fore femora slender, about 4.6-5.0 times longer than wide, with 4 external, 4 discoidal and 12 internal spines (arranged as follows: iIiIiIiIiIiI). Fore tibiae more than half as long as fore femora, longitudinally carinate, with 9 external and 10 internal spines. Fore tarsi slender, with the first tarsomere about as long as the remaining segments taken together. Mid and hind legs slender. Femora and tibiae covered by a dense long, erect and light pubescence. Mid and hind tarsi short and pubescent, with the first tarsomere about as long as the second (segments III, IV and V barely shorter). Apical lobes of tarsomeres triangular. Flying organs well developed, covering the abdomen except the terminalia. Tegmina subhyaline. Wings hyaline, a bit brownish at the apex and near the costal margin. Abdomen quite slender, sub-parallel, with longer than wide median tergites and sternites. Supra-anal plate sub-triangular, transverse, apically rounded. Cerci quite elongated, flattened (especially at the apex), covered by setae. Cerci made up of about 15 segments, of which the I-VI clearly transverse, the VII-VIII about as long as wide and the IX-XV clearly longer than wide.

**Morphometry (male)**. Body length: 28.0-31.0 mm. Pronotum length: 5.0-5.5 mm. Pronotum width: 2.0-2.5 mm. Fore coxae length: 4.0 mm. Fore femora length: 4.5 mm. Fore femora width: 1.0 mm. Fore tibiae length: 3.0 mm. Mid femora length: 4.5-5.5 mm. Mid tibiae length: 4.5-5.0 mm. Hind femora length: 9.0 mm. Hind tibiae length: 8.5-9.0 mm. Tegmina length: 19.0-20.0 mm.

**Morphometry (female)**. Body length: 35.0 mm. Pronotum length: 7.5 mm. Pronotum width: 3.0 mm. Fore coxae length: 5.5 mm. Fore femora length: 7.0 mm. Fore femora width: 1,5 mm. Fore tibiae length: 4,5 mm. Mid femora length: 5.5. Mid tibiae length: 5.5. Hind femora length: 10.5. Hind tibiae length: 11.0. Tegmina length: 8.0 mm.



**Figure 3**. Male holotypus of *Parameles (Parameles) acuta*. A: habitus in dorsal view; B: habitus in ventral view; C: male genitalia.

**Derivatio nominis**. The name "acuta" refers to the conical, acute, eyes that characterize this species.

**Variability**. Except for size, morphology of this species seems to be quite uniform in different populations. The specimens from Morocco have barely less acute eyes with more rounded apical tubercle than the Spanish ones.

**Comparative notes**. Parameles acuta is similar to Parameles picteti (with which it cohabits in southern Spain). It mainly differs for: more conical and acute eyes (instead of ovoid, with more curved sides), with a distinct and pointed apical tubercle (instead of small and rounded tubercle); female abdomen more slender. with median tergites longer than wide in rest position (instead of as long as wide or barely longer than wide); distal process of male genitalia with median and lateral branches similar in shape and equal in length (instead of lateral branch more developed and more acute) and with more sclerotized and darkened apex (instead of lightly sclerotized and not darkened apex); phalloid apophysis with thin, spiny-like, apical teeth (instead of more robust, triangular, apical teeth). In addition to this, *Parameles acuta* tends to have more slender pronotum and fore femora but length/width ratio seems to overlap with Parameles picteti in some cases. Females of *Parameles acuta* could be confused with females of *Parameles* (Pseudoyersinia), with which they probably cohabits in northern Algeria, but differs mainly for more developed tegmina, covering the first tergite and part of the second.

**Distribution**. This species in widespread in southern Iberian Peninsula (probably only in Andalucía) and in western Maghreb (Morocco and Algeria).

## Parameles (Parameles) picteti Saussure, 1869

## Parameles picteti Saussure, 1869

= Mantis assoi Bolívar, 1873 sensu Agabiti, 2002

**Examined material. Spain** (6 specimens: 2 males and 4 females): 1 male from Los Alcornocales, A381, 200 mt, legit P. M. Lopez; 1 male and 1 female from "Grenada"; 1 female from Val de Fierro, Saragoza, legit Majer; 2 females from Collado Villalba, VI.2011, leg. S. Correas, 3ot 417363 4498738 (Roberto Battiston collection). **Museum photos**. 1 male (syntypus) with the following data: " $\bigcirc$  Grenade // Espagne // Pictet", "Ameles // picteti Sauss." and "Syntypes" (MHNG, specimens.mantodearesearch.com). 1 female with the following data: " $\bigcirc$  Malaga // Espagne // H. de Saussure", "Ameles // picteti Sauss." and "Syntypes" (MHNG, specimens.mantodearesearch.com). 1 male with the following data: "Madrid // Bolivar" and "Ameles // assoi Bolivar // dedit Bolivar, 1898" (MSNG). 1 male with the following data: "Madrid // Bolivar", "Ameles // assoi Bolivar // Spagna" (MSNG).

**Distribution**. Southern to central Iberian Peninsula (reaching Salamanca and Saragoza), Balearic Islands (?), Tunisia (?). The report for Tunisia could be referred to *Parameles poggii* or a similar species.

**Observations**. As stated above, this species has been largely misinterpreted by some recent Authors. It corresponds to the *Ameles assoi* of AGABITI, SALVATRICE et LOMBARDO (2010).

## Parameles (Pseudoyersinia) Kirby, 1904 status novus

## Type species. Mantis brevipennis Yersin, 1860

**Diagnosis**. Small size, slender appearance. Eyes ovoid or slightly conical, with a small apical tubercle. Pronotum and fore femora relatively slender. Flying organs reduced in both sexes. Mid and hind legs covered by dense pubescence in males. Similar to *Parameles (Parameles)* but with shorter flying organs and more transverse tergites of female. Colour brown or green, with a longitudinal median stripe on abdomen.

**Description**. Vertex straight or a little convex in the middle. Eyes ovoid or slightly conical, with a more or less developed apical tubercle. Ocelli quite small in both sexes. Frontal sclerite quite large, pentagonal, with obtuse upper angle. Clypeus trapezoidal, divided in anticlypeus and postclypeus by a weak transversal carina.

Pronotum relatively slender, with not well marked supra-coxal dilatations. Prozone quite elongate, more than 1.5 times longer than wide. Margin of pronotum smooth. Median carina weak. Fore femora quite thin, longitudinally sulcate, with 4 external and 4 discoidal spines. Fore tibiae quite slender and sulcate. Mid and hind legs slender. Hind femora enlarged at their base. Walking legs covered by long, pale, erect and dense pubescence in males. Pubescence shorter in females, disposed on longitudinal lines on tibiae. Flying organs reduced, generally not reaching the apex of first tergite in both sexes. Tegmina drop-like. Wings of female with black anal field and orange discoidal field. Male wings partially opaque.

Abdomen relatively slender in females, sub-cylindrical. Median tergites of females a bit wider than long, with distinct and complete longitudinal lateral sulci. Male abdomen thinner, with sub-parallel margins. Supra-anal plate rounded or sub-triangular with rounded apex, more transverse in males. Cerci elongated in both sexes, exceeding the sub-genital plate (particularly in males). Apex of cercy distinctly flattened and elongated. Male genitalia with distal process divided in two quite robust teeth by a not so deep angulated incision, with the lower tooth more robust. Phalloid apophysis robust and sclerotized, a bit depressed, with bidentate apex.

**Observations**. This subgenus is closely related to nominotypical *Parameles* for similar shape of eyes, abdomen and male genitalia but it is clearly distinguishable

for shorter flying organs, more pubescent walking legs and shape of male genitalia. It also looks like *Parameles* (*Stenameles*) for the similar shape of distal process. The distribution of the species of this subgenus is enigmatic: three species live in northern Algeria, one in Sicily and one in Provence. A formerly wider Central-Mediterranean distribution, with further extinction in other areas, may be supposed.

*Parameles (Pseudoyersinia) brevipennis* (Yersin, 1860) combinatio nova **Examined material**. **Museum photos**. 1 male (syntypus) and 1 female (syntypus) with the following data: "Hyeres // Raymond", "Ameles // brevipennisYears."and "Coll.Yersin" (NEW, specimens.mantodearesearch.com).

Distribution. Provence (Hyeres).

*Parameles (Pseudoyersinia) inaspectata* (Lombardo, 1986) combinatio nova sub *Pseudoyersinia inaspectata* (Lombardo, 1986) **Distribution**. Northern Algeria (Yakouren forest).

*Parameles (Pseudoyersinia) kabilica* (Lombardo, 1986) combinatio nova **Distribution**. Northern Algeria (Akfadou forest).

Parameles (Pseudoyersinia) lagrecai (Lombardo, 1984) combinatio nova

**Examined material**. (26 specimens: 13 males and 13 females). **Sicily**: 1 female from Madonie, Piano Zucchi; 1 male from Madonie, V. P. Noce, 850 mt, legit Noce; 12 males and 12 females (ex ovo) from Bosco di Granza (PA), legit C. Muscarella (M. Villani breeding). **Museum photos**. 1 male and 1 female with the following data: "Sicilia // Palermo // Portella Impiso // 14-IX-1971 // M. C. & G. Kruseman" and "Pseudoyersinia // brevipennis (Yers.) // det. Kaltenbach, II.1977" (NMW, specimens.mantodearesearch.com).

Distribution. Widely widespread in Sicily.

*Parameles (Pseudoyersinia) salvinae* (Lombardo, 1986) combinatio nova **Distribution**. Northern Algeria (Dellys).

*Parameles (Stenameles)* subgenus novum **Type species**. *Ameles poggii* Lombardo, 1986 **Diagnosi**. Small size, slender body. Eyes ovoid, without an apical tubercle. Pronotum relatively slender, as in *Parameles (Parameles)*. Fore femora slender. Walking legs hairy in males. Males almost fully winged, females brachypterous. Abdomen slender.

**Description**. Vertex almost straight, a bit convex in the middle. Eyes moderately ovoid, distally angulate, without any apical tubercle. Frontal sclerite pentagonal, with obtuse upper angle and lateral suds about as long as upper sides. Clypeus trapezoidal, transverse, with a transversal carina. Antennae relatively thin, pale, with basal antennomeres about as long as wide or longer than wide.

Pronotum slender, 2.5 times as long as wide. Supra-coxal dilatations not well marked and situated before the middle of pronotum. Margin of pronotum smooth. Prozona elongated, about 2 times as long as wide. Fore femora relatively slender, with external surface with some longitudinal barely visible sulci. 4 external spines, 4 discoidal spines and 12 internal spines. Fore tibiae relatively slender, laterally sulcate. Walking legs slender, a bit thickened at the base of femora. Mid and hind femora with some sparse pubescence on the posterior margin especially. Mid and hid tibiae covered with quite dense, white and long pubescence. Walking leg tarsi short, with first segment about as long as the second. Flying organs well developed, covering the whole abdomen. Tegmina sub-hyaline, wings almost completely hyaline.

Male abdomen slender, with parallel sides. Supra-anal plate triangular, transverse. Cerci relatively elongated, a bit flattened, especially at the tip. Male genitalia with distal process divided in two pointed branch. The upper one is thinner and more acute than the lower one. The latter has largely rounded lower margin. Phalloid apophysis with posterior branch divided in two teeth by a rounded incision, with the lower one small and barely pointed.

**Derivatio nominis**. The name of the new subgenus is referred to the slender appearance of the body and to the relatively thin antennae in respect to other subgenera (*Parameles* and *Pseudoyersinia*).

**Observations**. Apparently very similar to *Parameles (Parameles)*, more probably this new subgenus represents an intermediate condition between *Leptameles* and *Pseudoyersinia*: it is similar to *Leptameles* for the absence of apical tubercle on eyes and for the shape of distal process of male genitalia and to *Pseudoyersinia* in ovoid shape of eyes. *Stenameles* differs from *Parameles* in having thinner and pale male antennae and for the lateral distal process of male genitalia clearly thinner than the median one.

*Parameles (Stenameles) poggii* (Lombardo, 1986) combinatio nova *Ameles poggii* Lombardo, 1986

**Examined material**. **Museum photos**. 1 male (Holotype) with the following data: "Libia occ. // Giado VII.38 // Ceg. Geo. Kruger", "Museo Civico // di Genova", "Ameles // poggii n. sp. // 1986 Lombardo det.", "Olotipo", Holotypus & // Ameles // poggii // Lombardo, 1986" (MCSN).

**Distribution**. Libya. Reports of *Ameles assoi* for Tunisia could be referred to this species.

## Parameles (Stenameles) melillensis Bolívar, 1914 status novus

Parameless assoi melillensis Bolívar, 1914

**Examined material. Museum photos.** 1 male (Holotypus) with the following data: "Melilla // L. Lozano", "Ameles // melillensis Bol.", "Ameles var. // melillensis Bol. // (tipo)", "Holotipo", "Ameles assoi // melillensis Bol. // det. E. Morales Agacino" (MNCN).

Distribution. Known for Morocco, Melilla.

**Observations**. BOLÍVAR (1914) describes *Parameles assoi melillensis* from Melilla, Morocco. In OTTE et SPEARMAN (2005) this subspecies is listed as "melillense Morales Agacino, 1948". MORALES AGACINO (1948) simply described the female of this taxon from the same locality. It should be noted that the type locality of *Ameles assoi assoi* reported in OTTE et SPEARMAN (2005) is that of *Ameles assoi melillensis* (while the true type locality of *Mantis assoi* is Madrid), for which no type locality is given.

Bolívar himself, in the original description, admitted that this subspecies could be a simple local form of *assoi* because it differs from the typical subspecies only in having darkened dorsal line of vertex. BEIER (1935) synonymizes this subspecies with *Ameles assoi*. MORALES AGACINO (1948) in the description of the female finds some other differences from typical subspecies: more slender appearance, narrower supra-coxal dilatations and shorter tegmina. EHRMANN (2002) definitely synonymised *Parameles assoi melillensis* with *Ameles assoi*.

I have examined the holotype male of *Parameles assoi melillensis* and compared it with the syntypes of *Parameles picteti*; they are, in my opinion, two different species. *Parameles assoi melillensis* has ovoid eyes without apical tubercle (with apical tubercle in *Parameles picteti*), the frontal sclerite is apically truncated, a little depressed (pointed in *Parameles picteti*) and antennae are thinner and paler (thicker and reddish in *Parameles picteti*). Shape of eyes and of antennae are traits shared with *Parameles poggii* and they lead me to include *melillensis* in subgenus *Stenameles*. *Parameles melillensis* differs from *Parameles poggii* in shape of frontal sclerite, with sub-truncate apex.

The correct name is *melillensis*, not *melillense* as written by MORALES AGACINO (1948) and OTTE et SPEARMAN (2005).

#### Parameles (Leptameles) subgenus novum

Type species: Ameles paui Bolívar, 1898

**Diagnosis**. Small size, quite slender body. Eyes rounded. Pronotum quite slender. Females brachypterous, males winged or brachypterous. Colour green or brown, with a longitudinal stripe on tergites of females. Similar to other *Parameles* but with rounded eyes.

**Description**. Head with straight vertex (a bit convex only in the middle). Eyes developed and rounded. Frontal sclerite pentagonal, with obtuse upper angle.

Pronotum quite slender, with not well marked and rounded supra-coxal dilatations. Prozone about 1.6-2 times as long as wide. Median carina of pronotum not well marked but visible. Margin of pronotum smooth. Fore femora relatively slender, a bit sulcate, with 4 external and 4 discoidal spines. Tibiae relatively slender and sulcate. Fore tarsi elongated. Mid and hind legs slender, covered by long, erect and pale hairs in males, with shorter hairs in females. Mid and hind tarsi short, with first segment about as long as the second. Flying organs reduced in females, generally covering only the first tergite or a part of the second. Female hind wings with black anal field and yellow-orange discoidal field. Flying organs more developed in males, covering at least two tergites but generally covering almost all the abdomen. Tegmina of males sub-hyaline, wings hyaline or a bit opaque in the anal field.

Abdomen quite slender in females, sub-cylindrical, with a longitudinal median stripe. Median tergites a bit wider than long, with more or less expressed lateral sulci. Male abdomen more slender, with sub-parallel margins. Supra-anal plate sub-triangular, rounded. Cerci quite developed in males, shorter in females. Male cerci more compressed and with distally more elongate segment. Male genitalia with distal process divided in two robust triangular teeth by a weak angulate incision. Phalloid apophysis divided in two teeth, with the upper one more developed.

**Derivatio nominis**. The name means "thin Ameles" and refers to the weak and slender aspect of the species of this subgenus.

**Observations**. The reduced lower tooth at the apex of phalloid apophysis suggests a basal position of *Leptameles* within *Parameles*, while in other subgenera both teeth are often distinct. This shape of phalloid apophysis, which is also less sclerotized than in other *Parameles*, probably derived from a single-toothed condition similar to *Apteromantis*, where the lower tooth is absent. This subgenus could be clearly divided in two groups: the "*Parameles andreae* complex" (*Parameles andreae*, *Parameles insularis*), with more protruding eyes, more slender pronotum, distinct and complete lateral longitudinal sulci on female tergites and more developed upper tooth of phalloid apophysis, and the "*Parameles paui* complex" (*Parameles paui, Parameles paradecolor*), with less protruding eyes, relatively more robust pronotum, less evident and incomplete lateral longitudinal sulci on female tergites

and less developed upper tooth of phalloid apophysis. The first one has a Balearic-Sardinian distribution and the second is widespread in the Iberian Peninsula.

*Parameles (Leptameles) andreae* (Galvagni, 1976) combinatio nova *Pseudoyersinia andreae* Galvagni, 1976

**Examined material** (3 specimens: 2 males and 3 females). **Sardinia**: 1 male from Rio Ollastu (CA), legit Daniele Sechi; 1 male from Isola Rossa (OT), legit Daniele Sechi; 1 female (ex larva) from Monte Limbara (OT), legit Marco Villani.

Distribution. Widespread in Sardinia, in both costal and mountain areas.

**Observations**. This species made part, with *Parameles insularis*, of "*Parameles andreae* complex", which is characterized by more protruding eyes, slender pronotum with more distinct supra-coxal dilatations, distinct and complete longitudinal lateral sulci on female tergites and by a more developed upper tooth of phalloid apophysis in male genitalia.

BATTISTON et alii (2018) removed this species from *Pseudoyersinia* after the discovery of the long-winged male.

*Parameles (Leptameles) insularis* (Agabiti, Salvatrice et Lombardo, 2010) combinatio nova

Ameles insularis Agabiti, Salvatrice et Lombardo, 2010

**Examined material** (3 specimens: 2 males and 1 female). **Mallorca**: 1 male and 1 female from Palma de Mallorca, Son Rapinya. **Ibiza**: 1 male from Las Salinas, 0 mt, legit P. Lopez.

Figure 4. A-L: head of Parameles species. A: Parameles (Parameles) picteti female; B: Parameles (Parameles) picteti male; C: Parameles (Parameles) acuta female; D: Parameles (Parameles) acuta male; E: Parameles (Pseudoyersinia) lagrecai female; F: Parameles (Pseudoyersinia) lagrecai male; G: Parameles (Stenameles) poggii male; H: Parameles (Stenameles) melillensis male; I: Parameles (Leptameles) paui female; J: Parameles (Leptameles) paui male; K: Parameles (Leptameles) andreae female; L: Parameles (Leptameles) andreae male. M-X: pronotum of Parameles species. M: Parameles (Parameles) picteti female; N: Parameles (Parameles) picteti male; O: Parameles (Parameles) acuta female; P: Parameles (Parameles) acuta male; Q: Parameles (Pseudoyersinia) lagrecai female; R: Parameles (Stenameles) melillensis male; S: Parameles (Stenameles) poggii male; T: Parameles (Stenameles) melillensis male; U: Parameles (Leptameles) paui female; V: Parameles (Stenameles) melillensis male; U: Parameles (Leptameles) paui female; X: Parameles (Stenameles) melillensis male; U: Parameles (Leptameles) paui female; X: Parameles (Leptameles) paui male; W: Parameles (Leptameles) andreae female; X: Parameles (Leptameles) paui male; W: Parameles (Leptameles) andreae female; X: Parameles (Leptameles) andreae male.





















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Distribution. Balearic Islands.

**Observations**. Described for Mallorca, I have also one male from Ibiza that probably belong to this species.

BATTISTON et alii (2018) consider this species a synonym of *Parameles andreae* (sub *Ameles andreae*). I have examined males and females of both species and



**Figure 5**. A-E: female abdomen (tergites II-VI) of *Parameles* species. A: *Parameles* (*Parameles*) *picteti*; B: *Parameles* (*Parameles*) *acuta*; C: *Parameles* (*Pseudoyersinia*) *lagrecai*; D: *Parameles* (*Leptameles*) *paui*; E: *Parameles* (*Leptameles*) *andreae*. F-I: male genitalia of *Parameles species*. F: *Parameles* (*Parameles*) *picteti* (with particular of the distal process of the male syntypus); G: *Parameles* (*Parameles*) *acuta*; H: *Parameles* (*Pseudoyersinia*) *lagrecai*; I: *Parameles* (*Leptameles*) *andreae*.

their similarity is undeniable, but I have found also some differences, such as more protruding female eyes and a bit shorter pronotum of *Parameles insularis*. Phalloid apophysis shows as well some differences. Moreover the geographical division of this species suggests a species-level distinction. Some differences have been found also between medium/high altitude and lowland specimens of *Parameles andreae* and this fact suggests that it could be a single variable species. The study of more specimens from Balearic Islands and their genitalia is necessary to confirm the synonymy proposed by BATTISTON et alii (2018).

# *Parameles (Leptameles) paradecolor* (Agabiti, Salvatrice et Lombardo, 2010) combinatio nova

Ameles paradecolor Agabiti, Salvatrice et Lombardo, 2010

**Examined material** (3 males). **Spain**: 3 males from Los Alcornocales, A381, 200 mt, legit P. M. Lopez.

Distribution. Widespread in Iberian Peninsula.

**Observations**. South-eastern populations of this species appear slightly different from central and western ones in their more slender habitus and shorter flying organs of males. Especially in the area of Tarragona, males of this species have rather reduced wings covering about one half of abdomen. It is not clear to me whether these populations deserve a species-level distinction.

# Parameles (Leptameles) paui (Bolívar, 1898) combinatio nova

## Ameles paui Bolívar, 1898

**Examined material**. **Museum photos**. 1 male (lectotypus) with the following data: "Ameles // paui Bol. // Morella", "Segun Bolívar (18 // 98) fue recolectado // a ultimos de agos- // to por Pau" and "Lectotipo" (MNCN).

Distribution. Endemic to south-eastern Spain.

**Observations**. It is similar to *Parameles paradecolor* but males have shorter wings, covering at most the first two tergites.

## Conclusions

A new supra-specific arrangement of Amelini is proposed. This proposal is only based on classical morphological observations. No attempt was made to support taxonomic changes through genetic research. Therefore further studies are desirable to genetically check the new taxonomic arrangement.

*Ameles* (23 species) and *Parameles* (13 species) are recognized as distinct genera, characterized by many external and genital features. Each genus has been divided into more subgenera: *Ameles* includes *Ameles* (sensu stricto), *Pilosameles* 

subgen. nov., *Canariameles* subgen. nov. and *Apterameles*; *Parameles* includes *Parameles* (sensu stricto), *Pseudoyersinia*, *Stenameles* subgen. nov. and *Leptameles* subgen. nov..

The genus *Apteromantis* is recognized as closely related to *Parameles*, with which it shares several features (shape of vertex, pronotum and fore femora, pubescence of walking legs, long and flattened cerci, aspect of male genitalia).

Some taxa will be treated in detail in further contributions, as I need more material of some of them. In particular, some species require the study of types and additional specimens to clarify their taxonomic position:

- *Ameles* (*Canariameles*) (all species). This Canarian endemic subgenus is hard to find in collections and males are often more rare than females. I was able to examine only two species of *Canariameles* and male genitalia of this group need to be studied further.

- Ameles (Apterameles) arabica. It is not clear if this species belongs to the "Ameles kervillei complex". All known species of this complex show small lobes on tergites of females, of which there is no trace in the description of the female of this species (KALTENBACH, 1982). Rounded apical lobes of walking tarsi could confirm the belonging of this species to "Ameles kervillei complex".

- Ameles (Apterameles) dumonti. This species is certainly recorded only from Tunisia. CHOPARD (1942) reported this species for southern Morocco but the specimen he examined probably belongs to a different species, such as Ameles moralesi. Another unsolved case regarding Ameles dumonti is the identity of Lampedusan and Sicilian specimens. These specimens were previously identified as Ameles picteti but their external and genital morphology clearly reminds Ameles dumonti. It is also possible that at least the Sicilian specimens belong to a new taxon.

- *Ameles (Apterameles) massai.* This species, only known for male specimens, clearly belongs to "*Ameles kervillei* complex" and it is recorded from near the areal of *Ameles kervillei.* It could be a synonym of the latter.

- Ameles (Apterameles) moralesi. This species is another member of "Ameles kervillei complex" for having dorsal lobes on abdomen. However it is known for a single female and I was not able to see directly any specimen of it. The male specimen of Ameles dumonti reported for western Morocco (CHOPARD, 1942) could belong to Ameles moralesi, or these two species could be synonyms.

- Ameles (Apterameles) syriensis. Very similar to Ameles heldreichi and sharing its areal with it. Study of more specimens attributed to this species could show it is a synonym.

- Ameles (Apterameles) wadisirhani. Another species of "Ameles kervillei complex" recorded near the areal of Ameles kervillei. It could be a synonym of it.

- *Parameles (Pseudoyersinia) (kabilica, inespectata, salvinae).* The three Algerian species of this subgenus are known for few or single type specimens and they all live in a restricted area of northern Algeria. It is necessary to examine new specimens of both sexes to confirm the validity of all of them and to clarify their differences.

- Parameles (Leptameles) insularis. The validity of this species is unclear. It is similar to Parameles andreae and BATTISTON et alii (2018) considered Parameles insularis (sub Ameles insularis) a synonym of it. I have examined only three specimens of Parameles insularis and still have some doubts on the validity of this taxon.

In some cases it is necessary to carry out more research in the regions where some rare species live, but at the moment this is rather difficult, due to the political situation of some states of North Africa and the Middle East.

All these species will be treated in further contributions, provided that I have been able to study additional specimens.

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#### References

ABU-DANNOUN O. & KATBEH-BADER A., 2007 - Mantodea of Jordan; Zootaxa, 1617: 43-56.

- AGABITI B., 2002 Le specie Mediterranee del genere *Ameles* Burmeister, 1838 (Insecta, Mantodea: Amelinae) con considerazioni biogeografiche e filogenetiche; Tesi di Dottorato in Biologia Evoluzionistica (Filogenesi e Sistematica), Università degli Studi di Catania, Dipartimento di Biologia Animale.
- AGABITI B., SALVATRICE I. & LOMBARDO F., 2010 The Mediterranean Species of the Genus *Ameles* Burmeister, 1838 (Insecta, Mantodea: Amelinae), with a Biogeographic and

Phylogenetic Evaluation. *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)*, 47: 1-20.

- BATTISTON R., 2004 Etologia e sistematica di Mantodei italiani: dinamica di popolazione, territorialità e cannibalismo in *Mantis religiosa*; sistematica delle *Ameles* italiane. Tesi di laurea in Scienze Naturali presso la Facoltà di Scienze MM. FF. NN. dell'Università degli Studi di Padova.
- BATTISTON R. & FONTANA P., 2005 A contribution to the knowledge of the genus Ameles Burmeister, 1838, with the description of a new species from Jordan (Insecta, Mantodea). Atti Accademia Roveretana degli Agiati, serie 8, 5: 173-197.
- BATTISTON R., ORTEGO J., CORREAS J.R. & CORDERO P.J., 2014 A revision of *Apteromantis* (Mantodea: Mantidae, Amelinae): A comprehensive approach to manage old taxonomic and conservation problems. *Zootaxa*, 3797 (1): 065-077.
- BATTISTON R., CORREAS J., LOMBARDO F., MOUNA M., PAYNE K. & SCHÜTTE K., 2018 - Morphological convergences in *Ameles* Burmeister and *Pseudoyersinia* Kirby: Taxonomic implications of wing reduction and flight predisposition in some West-Mediterranean Amelini (Insecta: Mantodea). *Zootaxa*, 4377 (1): 021-038.
- BATTISTON R., PICCIAU L., FONTANA P. & MARSHALL J., 2010 The Mantids of the Euro-Mediterranean Area, *WBA Handbooks*, 2, Verona, Italy, 239 pp.
- BEIER M., 1935 Mantodea, Fam. Mantidae, Subfam. Mantinae. Genera Insectorum, 203. Bruxelles: Desmet-Verteneuil; p. 146 + 3, 8 pl. (Nachträge 1937d, 3 pp.).
- BLAND R.G., GANGWERE S.K. & MORALES MARTÍN M., 1996 An annotated list of the Orthoptera of the Canary Islands. *Journal of Orthoptera Research*, 5: 159-173.
- BODENHEIMER F.S., 1937 Prodromus Faunae Palestinae. *Memoires de L'Institut d'Egypt*, Cairo, Egypte, 23: 221-222.
- BOLÍVAR I., 1897 Insectos recogidos en Cartagena por D. José Snachez Gomez. Forficulidos-Blattidos-Mantidos-Acrididos-Grillidos-Locustidos. Actas de la Real Sociedad Espanola de Historia Natural, (2-26): 166-168.
- BOLÍVAR I., 1914 Dermapteros y Orthopteros de Marruecos. *Memorias de la Sociedad Espanola de Historia Natural*, 8(5): 157-161, 176,183.
- BOLÍVAR I., 1936 Apuntes para la fauna entomologica de Ifni (Orthopteros). *Eos*, Madrid, 11: 395-436.
- BURMEISTER K.H.K., 1838 Fangheuschrecken. Mantodea. In: Handbuch der Entomologie. Zweiter Band. Besondere Entomologie. Zweite Abtheilung. Kaukerfe, Gymnognatha (Erste Hälfte; vulgo Orthoptera). Berlin: Enslin; p. 517-552.
- CHOPARD L., 1942 Contribution à l'étude des Orthoptéroïdes du Nord de l'Afrique. Bulletin de la Société entomologique de France, 47 (10): 163-165.
- CHOPARD L., 1942 Insectes Orthoptéroïdes (Blattidae, Mantidae, Gryllidae, Phasmidae, Dermaptera) récoltés dans les îles atlantiques. *Societas Scientiarum Fennica -Commentationes Biologicae*, 8 (4), 1-13.
- CHOPARD L., 1954 Insectes Orthoptéroïdes récoltés aux îles Canaries par M. H. Lindberg. Societas Scientiarum Fennica. Commentationes Biologicae, 14 (7), 1-15.

- EHRMANN R., 2002 *Mantodea Gottesanbeterinnen der Welt*. Münster: Natur und Tier Verlag GmbH, 519 pp.
- FINOT A., 1895 Faune de l'Algérie et de la Tunisie Insectes Orthoptéres. *Annales de la Société entomologique de France*, 64: 57-120.
- GANGWERE S.K., MORALES MARTÍN M. & MORALES AGACINO E., 1972 The distribution of the Orthopteroidea in Tenerife, Canary Islands, Spain. *Contributions of the American Entomological Institute*, 8 (1), 1-40.
- GIGLIO-TOS E., 1927 Das Tierreich. Orthoptera Mantidae. *Walter de Gruyter & Co.*, Berlin, 707 pp.
- HARZ K. & KALTENBACH A.P., 1976 Die Orthopteren Europas III. Dr. W. Junk, Serie 12, 3: 434 pp.
- JACOBSON G.G. & BIANKI W.L., 1902 Die Orthopteren und Pseudoneuropteren des Russischen Reiches und der angrenzenden Länder, nach R. Tümpel's Werk. [Russisch]. St. Petersburg. 953 pp.
- KALTENBACH A., 1963 Kritische Untersuchungen zur Systematik, Biologie und Verbreitung der europäischen Fangheuschrecken (Dictyoptera-Mantidea). Zoologische Jahrbücher, Syst. Bd., 90: 521-598.
- KALTENBACH A.P., 1979 Die Mantodea der Kanarischen Inseln. Kritische Übersicht und ergänzende Beschreibungen. Annalen des Naturhistorischen Museums in Wien, 82: 517-531.
- KALTENBACH A., 1982 Insects of Saudi Arabia Mantodea. Fauna of Saudi Arabia, 4: 29-72.
- KIRBY W.F., 1904 A synonymic catalogue of Orthoptera, vol. I, Orthoptera, Euplexoptera, Cursoria et Gressoria. London, 501 pp.
- LOMBARDO F., 1984 *Pseudoyersinia lagrecai*, nuova specie di mantodeo di Sicilia. *Animalia*, Catania, 11(1-3): 23-29.
- LOMBARDO F., 1986 Su alcuni mantodei della Libia e descrizione di una nuova specie di *Ameles. Annali Museo civico Storia naturale Giacomo Doria*, 86: 265-272.
- LOMBARDO F., 1986 Sulla presenza in Algeria del genere *Pseudoyersinia* Kirby 1904 (Insecta, Mantodea) e descrizione di tre nuove specie. *Animalia*, Catania, 12 (1-3):119-128.
- MORALES AGACINO E., 1947 Mántidos de la fauna ibérica; *Boletin Patologia Vegetal Entomologia Agricola*, 15: 131-164.
- MORALES AGACINO E., 1948 Apuntes sobre los Dictyoptera marroquíes del Instituto Español de Entomología. *Eos*, Madrid, 24(3): 335-368.
- OBERTEGGER U. & AGABITI B., 2012 On the usefulness of ratios for the identification of some Mediterranean species of the genus *Ameles* Burmeister, 1838 (Insecta, Mantodea). *Zootaxa*, 3259: 34-50.
- OTTE D. & SPEARMAN L., 2005 Mantida Species File. Catalog of the Mantids of the World. Insect Diversity Association, Philadelphia, 1, 489 pp.
- PÉREZ A.J., MORALES E., OROMÍ P. & LÓPEZ H., 2003 Fauna de artrópodos de Montaña

Clara (islas Canarias). II: Hexápodos (no coleópteros). Vieraea, 31, 237-251.

- RAMBUR J.P., 1838 Faune entomologique de l'Andalousie, Arthus Bertrand, Librarie Editeur, Paris, 176 pp.
- RIGGIO G. & PAJNO F., 1886-1887 Primo saggio di un catalogo metodico degli Ortotteri sin'ora osservati in Sicilia. *Naturalista siciliano*, Palermo, 6: 23-27, 43-46, 47-50 e 63-69.
- SAUSSURE H., 1869 Essai d'un système des Mantides. *Mittheilungen der Schweizerischen* entomologischen Gesellschaft, 3(2): 49-73.
- SAUSSURE, H., 1871 Mélanges Orthoptérologiques IV. Mantides. Genève & Bale, H. Georg, 1863-1871, 3. Lfg., 1(2): 149-362.
- SCHWARZ C.J. & ROY R., 2019 The systematics of Mantodea revisited: an updated classification incorporating multiple data sources (Insecta: Dictyoptera). *Annales de la Société entomologique de France (N.S.)*, 55 (2)): 101-196.
- UVAROV B.P., 2012 Ueber die Orthopterenfauna Transcaspiens. *Horae Soc. Entomol. Ross.*, 40 (3): 1-54.
- UVAROV B.P., 1931 Orthoptera Collected by Professor T. D. A. Cockerell in Morocco. Bull. Soc. Sci. Nat. Maroc., 10: 210-214.
- UVAROV B.P., 1939 Studies in the Arabian Orthoptera. II. New and little-known Mantidae and Phasmidae. J. Linnean Society of London (Zoology), 40: 547-559.
- UVAROV B.P., 1948 Andalusian Orthoptera described by Rambur. *EOS*, Madrid, 14 (3): 369-375, 388-389.
- WERNER F., 1929 Wissenschaftliche Ergebnisse einer zoologischen Forschungsreise nach Westalgerien und Marokko. Dermapteren und Orthopteren us Westalgerien und Morokko. Sitzungsber. Akademie der Wissenschaften, 2: 167-188.
- WERNER F., 1931 Ergebnisse einer zoologischen Forschungsreise nach Marokko; Unternommen 1930 mit Unterstützung der Akademie der Wissenschaften in Wien von Franz Werner und Richard Ebner. Sitzungsber. Akademie der Wissenschaften Wien Mathem. Naturw., 68: 202.
- WIELAND F., SHÜTTE K. & GOLDBERG J., 2014 A review on the research on Canary Islands praying mantises (Mantodea). Zootaxa, 3797 (1): 78-102.
- WIEMERS M., 1993 Eine neue Gottesanbeterin der Gattung Pseudoyersinia von den Kanarischen Inseln (Mantodea, Mantidae). Nachrichten des entomologischen Vereins Apollo, Frankfurt/Main N.F., 14 (3), 261-269.

Sitography.

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https://specimens.mantodearesearch.com/

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