

## THE MEDITERRANEAN SPECIES OF THE GENUS *AMELES* BURMEISTER, 1838 (INSECTA, MANTODEA: AMELINAE), WITH A BIOGEOGRAPHIC AND PHYLOGENETIC EVALUATION

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**Abstract:** The Mediterranean species of the genus *Ameles* Burmeister are revised. *Ameles pardecolor* sp. n., from the Iberian Peninsula, and *Ameles insularis* sp. n., from the island of Mallorca, are described. *A. africana* Bolívar and *A. modesta* Bolívar are new synonyms of *Ameles spallanzania* Rossi; *A. cyprica* Uvarov is a new synonym of *A. heldreichi* Brunner. Neotypes are designed for the following species: *A. spallanzania* (Rossi) and *A. aegyptiaca* Werner. In total 13 Mediterranean species are recognized. Each species is presented with a diagnosis, full description, distribution data and a comprehensive bibliography. A key to both males and females is provided. A cladistic analysis, using twenty-one morphological characters, revealed the monophyly of the genus, where two major clades are identified: the "*spallanzania*" and "*picteti*" species groups. Finally, biogeographic remarks based on our phylogenetic hypothesis are also provided.

**Key words:** Mantodea, *Ameles*, systematics, cladistics, biogeography, Mediterranean.

### Especies mediterráneas del género *Ameles* Burmeister, 1838 (Insecta, Mantodea: Amelinae), with biogeographic and phylogenetic evaluation

**Resumen:** Se revisan las especies mediterráneas del género *Ameles* Burmeister. Se describen *Ameles pardecolor* sp. n., de la Península Ibérica, y *Ameles insularis* sp. n., de la isla de Mallorca. *A. africana* Bolívar y *A. modesta* Bolívar son nuevos sinónimos de *Ameles spallanzania* Rossi; *A. cyprica* Uvarov es un nuevo sinónimo de *A. heldreichi* Brunner. Se designan neotipos para las siguientes especies: *A. spallanzania* (Rossi) y *A. aegyptiaca* Werner. En total se reconocen 13 especies mediterráneas. Se da, en cada especie, una diagnosis, descripción completa, datos de distribución y una amplia bibliografía. Se proporciona una clave para machos y hembras. El análisis cladístico, sobre 21 caracteres morfológicos, ha revelado la monofilia del género e identificado dos clados principales, los grupos "*spallanzania*" y "*picteti*". Por último, se aportan, igualmente, comentarios biogeográficos basados en nuestras hipótesis filogenéticas.

**Palabras clave:** Mantodea, *Ameles*, sistemática, cladística, biogeografía, Mediterráneo.

**Taxonomy / Taxonomía:** *Ameles pardecolor* sp.n., *Ameles insularis* sp.n.

## Introduction

The genus *Ameles* includes small xerothermophile species, with body sizes ranging from 20 mm to 30 mm; the males are normally winged, while the females are micropterous. They are ground-dwellers preferring steppe habitats where, especially the females, move quickly. In the more sparse coastal Mediterranean scrub and in the internal zones rich in herbaceous vegetation, they also live on bushes; they are also found at elevated altitudes: *Ameles* sp. (*prope* spallanzania?) in the Mount Atlante has been found as high as 2000 meters.

The genus *Ameles* has a Mediterranean-turanian distribution and its geographic limits are from the West the Atlantic coasts of Portugal and Morocco up to the Canary Islands, to the East the territories of Afghanistan. Within this large geographic area the genus is currently represented by 23 taxa between species and sub-species according to Ehrmann, 2002 or 29 taxa according to Otte and Spearman, 2005. Notwithstanding the various revisions carried out in the past (Sausurre, 1870; Giglio-Tos, 1927; Chopard, 1943; Kaltenbach, 1963, 1976; Agabiti, 2002; Battiston & Fontana, 2005), we are still far from having a satisfactory taxonomic and systematic picture for the genus. Despite several attempts to organize the taxonomy and systematics of this genus, a more comprehensive taxonomic treatment has been prevented due to the lack of critical material from Central Asia. Nonetheless, we

believe that it would be important to report here what we have achieved so far in the study of this genus regarding the species from the Mediterranean area.

## Materials and methods

For the present revision, we examined a total of 246 specimens from different regions within the Mediterranean area. Studied material belong to the following collections:

MDBU- Museo e Dipartimento di Biologia Animale Catania  
MCSN- Museo Civico di Storia Naturale Milano  
MNHN- Muséum national d'Histoire naturelle Paris  
MSNG- Museo Civico di Storia Naturale Genova  
NHML- Natural History Museum London  
NHMW- Naturhistorisches Museum Wien  
NMNC- Museo Nacional de Ciencias Naturales Madrid  
Baccetti Collection (private collection)

## Measurements

The measurements were taken under a dissecting microscope using an ocular eyepiece with a scale bar. The following measurements were taken: TL= total length of the body, measured from the fore margin of the head to the apex of abdomen; HW= head width, measured from between the

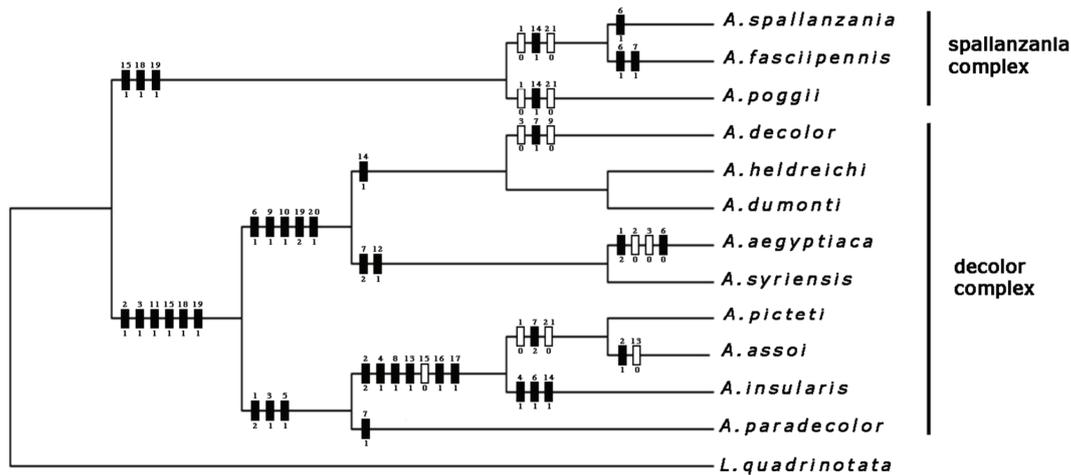


Fig. 1. Strict consensus of the seven equally parsimonious cladogram, black box, character change; open box, character state reversal.

lateral margins of the eyes; PL= pronotal length measured from the fore margin to posterior margin of pronotum; ML= metazone length measured from the supracoxal sulcus to posterior margin of pronotum; SDW= supracoxal dilation width measured between the lateral margins of supracoxal sulcus; MPW= pronotal minimum width; CL= coxal length measured from the coxal insertion to external margins of distal lobes; FL= femoral length measured from the basal apex to external margin of the geniculare lobe; MFW= femoral maximum width; WL= length tegmina measured from the thoracic insertion to distal margin. Minimum and maximum dimensions of the all species treated in this work are reported in Table I. Anatomical terminology follows Snodgrass (1935), except for the copulatory apparatus that follows La Greca (1954). All illustrations were produced using a camera lucida connected to Leica MZ12 dissecting microscope.

#### Data analysis.

Phylogenetic relationships among *Ameles* were investigated using the branch-and-bound algorithm of PAUP version 4.0 Swofford (1993). The analysis included one outgroup (*Ligaria quadrinotata* Stål), 13 ingroup species and 21 morphological characters. *A. kervillei*, *A. moralesi* and *A. massai* were not included in the analysis because we have not specimens belonging to these species. For all characters, one plesiomorphic (0) and two apomorphic or derived characters states (1, 2) were distinguished. Character state 1 was considered intermediate between states 0 and 2. In this way a matrix was obtained (Table II) with 21 columns (characters) and 13 rows (species). The analysis of the data from the matrix produced only one cladogram of 23 steps with Consistency index (CI)= 0.58; Homoplasy index (HI)= 0.4872; Retention index (RI)= 0.72). The tree with the apomorphic state of each character, including homoplasies, is shown in figure 1.

Two main well-supported sister-complex were resolved within the *Ameles* group: the *A. spallanzania* complex, including *A. spallanzania* (Rossi), *A. fasciipennis* Kaltenback and *A. poggii* Lombardo and the *A. decolor* complex including *A. decolor* (Charpentier), *A. dumonti* Chopard, *A. heldreichi* Brunner, *A. aegyptiaca* Werner, *A. syriensis* Gigliot-Tos, *A. picteti* (Saussure), *A. assoi* (Bolivar), *A. insularis* n.sp. and *A. paradecolor* n.sp.

#### Monophyly of the *Ameles*

The monophyly of the genus is defined by one apomorphic character: distal process of the ventral phallomere always forked (Ch. 20:1). It is simple and unilobed in the outgroup and in all *Ameles* from Ethiopian region were has been examined the copulatory apparatus.

#### Monophyly of the *A. spallanzania* complex

Monophyly of this complex is well established by a synapomorphic character:

Ch. 20. Distal process of ventral phallomere with two unequal in size teeth separated by a deep incisure. This character has twice appeared convergently: a first time in the *A. spallanzania* complex and a second time in the *A. picteti*.

In this complex *A. poggii* is at the base of the clade, *A. spallanzania* and *A. fasciipennis* are a sister-species favoured by the following one character:

Ch. 7:1. Middle and posterior legs with short hairs; this character is found only in this group.

#### Monophyly of the *A. decolor* complex

Monophyly of this complex is well established by the following four apomorphic characters:

Ch. 3:1. Pronotum slender, supracoxal dilation not well developed. Usually in the *Ameles* the pronotum is short, robust and the supracoxal dilation is well developed. Consequently it is an apomorphic condition.

Ch. 4:1. Anterior margin of fore coxa smooth (without spines), this character is found only in this complex (simplification of a character usually represent an evolution).

Ch.6:1. Anterior femora slender, they are robust in the outgroup and in all *Ameles* from Ethiopian region.

Ch.12:1. Females with cylindrical abdomen, it is rhomboid in the outgroup.

#### Relationships of the *A. decolor* complex

As stated above, characters (3), (4), (6) and (12) support the sister-group relationship of the *A. decolor* + *A. dumonti* + *A. heldreichi* + *A. aegyptiaca* + *A. syriensis* with *A. picteti* + *A. assoi* + *A. insularis* + *A. paradecolor*. The following three characters support the sister-group relationship between *A. decolor* + *A. dumonti* + *A. heldreichi* and *A. Aegyptiaca* + *A. syriensis*:

Tab. I. Minimum and maximum dimensions of the all species treated in this work.

Species		n	TL	HW	PL	SDW	MPW	CL	FL	MFW	WL		
<i>spallanzania</i>	♂	Min.	64	25	3,2	3,6	2,2	1,4	3,4	4,4	1,1	17	
		Max.		40	4,3	5,3	3,1	2,1	5,2	6,4	2,7	25	
		Mean		31,5	3,35	3,9	2,65	1,75	4,36	5,37	1,6	21	
	♀	Min.	33	18	4,1	5,4	3,2	1,4	4,1	4,5	1,4	4,1	
		Max.		27	5,6	5,9	4,4	2,5	6,4	7,2	2,7	5,8	
		Mean		22,5	5,1	5,6	3,6	2,1	5,1	6,1	2,2	4,9	
<i>decolor</i>	♂	Min.	31	18	3	3,9	2,	1,3	3,2	4,8	1,1	18	
		Max.		27	4,2	5,5	3,2	1,9	4,3	5,6	1,7	25	
		Mean		22,5	3,6	4,7	2,3	1,6	3,6	5	1,3	22	
	♀	Min.	38	19	3,4	4,5	2,1	1,2	3,5	4,3	1,3	4,5	
		Max.		28	5	5,5	3	1,8	4,9	5,6	2	5,8	
		Mean		22	4,1	5,1	2,5	1,5	4,1	5,3	1,5	5	
<i>picteti</i>	♂	Min.	5	30	3,3	5,3	2	1,3	4,3	4,6	1	25	
		Max.		33	3,5	5,6	2,3	1,5	4,4	4,9	1,2	28	
		Mean		31	3,4	5,45	2,2	1,4	4,35	4,7	1,1	26,5	
	♀	Min.	1	35	4,5	7,6	3	2,1	5,5	7	1,5	8	
	<i>assoi</i>	♂	Min.	11	24	3,2	4,7	1,9	1,3	3,6	4,6	1	17
			Max.		28	3,7	5,4	2,4	1,6	4,3	5,7	1,2	22
		Mean		25,5	3,5	5,2	2,1	1,4	4	5,5	1,1	18,5	
	♀	Min.	4	26	3,1	4,7	2,4	1,3	3,6	4,7	1,1	5,8	
		Max.		29	4,3	6,1	2,7	1,6	5,3	6	1,2	6,5	
		Mean		27,5	3,5	5,6	2,5	1,4	4,2	5,3	1,15	6,2	
<i>heldreichi</i>	♂	Min.	22	22	3,3	4,7	2,1	1,4	3,4	4,4	1	16	
		Max.		28	3,8	5,6	2,7	2,4	4,7	5,47	1,6	22	
		Mean		25	3,5	5,3	2,4	1,9	3,8	4,7	1,3	19	
	♀	Min.	23	23	3,7	4,2	2,1	1,4	3,1	4,1	1,3	5,7	
		Max.		30	4,5	6,2	3	2,3	4,2	5,6	1,7	6,6	
		Mean		27	4,3	5,5	2,5	1,7	3,9	5,2	1,45	6,15	
<i>aegyptiaca</i>	♂	Min.	1	25	3,7	3,6	2,2	1,4	3,5	4,1	1,1	18	
		Min.	1	22	4,1	4,2	2,4	1,5	3,5	4,6	1,3	3,6	
	<i>kervillei</i>	♀	Min.	4	24	4,7	5,4	3	2,1	5,5	6,4	2	3,6
		Max.		28	5,2	6,6	3,7	2,6	5,7	6,6	2,1	3,8	
		Mean		25,5	4,82	6,07	3,35	2,33	5,6	6,5	2,05	3,7	
<i>syriensis</i>	♂	Min.	1	23	3,5	4,4	2,4	1,5	3,7	4,7	1,2	22	
		Min.	1	22	4,4	5,6	2,7	1,7	4,5	5,6	1,6	6,2	
	<i>dumonti</i>	♂	Min.	3	22	3,2	4	1,7	1	3,3	3,8	0,9	19
		Max.		24	3,5	4,5	1,9	1,2	3,7	4,2	1,1	23	
		Mean		23	3,3	4,2	1,8	1,1	3,5	4	1	21	
<i>insularis</i>	♂	Min.	1	25	3,3	4,5	1,9	1,3	3,7	4,8	1	19	
	<i>paradecolor</i>	♂	Min.	1	26	3,6	4,7	2,1	1,4	3,5	4,6	1,1	11,2
		♀	Min.	1	24	4,1	6,0	2,9	1,9	4,7	5,9	1,4	5,4

Tab.II . Data matrix for the cladistic analysis used to produce the cladogram shown in Fig.1.

					5					10					15				20		
<i>A. spallanzania</i>	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	1	0	0	
<i>A. decolor</i>	1	1	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	2	1	1
<i>A. picteti</i>	0	2	1	1	1	0	2	1	0	0	1	0	1	0	0	1	1	1	1	0	0
<i>A. assoi</i>	0	1	1	1	1	0	2	1	0	0	1	0	0	0	0	1	1	1	1	0	0
<i>A. heldreichi</i>	1	1	1	0	0	1	0	0	1	1	1	0	0	1	1	0	0	1	2	1	1
<i>A. aegyptiaca</i>	2	1	0	0	0	0	2	0	1	1	1	1	0	0	1	0	0	1	2	1	1
<i>A. syriensis</i>	1	1	1	0	0	1	2	0	1	1	1	1	0	0	1	0	0	1	2	1	1
<i>A. dumonti</i>	1	1	1	0	0	1	0	0	1	1	1	0	0	1	1	0	0	1	2	1	1
<i>A. insularis</i>	2	2	1	1	1	1	0	1	0	0	1	0	1	1	0	1	1	1	1	1	1
<i>A. paradecolor</i>	2	1	1	0	1	0	1	0	0	0	1	0	0	0	1	0	0	1	1	1	1
<i>A. fasciipennis</i>	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1	0	0
<i>A. poggii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0
<i>L. quadrinotata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ch. 11:1. Principal longitudinal veins of mesothoracic wing alternatively with ochraceous and blackish lines. *Ameles* as the majority number of the species of the Ethiopian region, including the outgroup, have normally the principal mesothoracic veins uniformly ochraceous; this condition is considered a plesiomorphie.

Ch. 20:1. Distal process of ventral phallomere with two equal teeth not separated by a deep incisure. This character is found only in this group and must be considered an apomorphie.

Ch. 21:1. Phalloid apophysis of the left phallomere without apical teeth.

The sister-group relationship between *A. decolor* + *A. dumonti* and *A. heldreichi* is supported by one character:

Ch. 15:1. Subgenital plate as long as wide.

In this group *A. heldreichi* is at the base of the clade, *A. decolor* and *A. dumonti* are a sister-species favoured by the presence of a transverse frontal shield.

The sister-species relationship between *A. aegyptiaca* and *A. syriensis* is favoured by the presence of a tooth on distal tergite margin. This character is found only in this group and it is an apomorphic character.

The sister group relationship between *A. picteti* + *A. assoi*, + *A. insularis* and *A. paradecolor* is supported by one character: Ch. 6:2. Anterior femur is very slender. In the Amelinii the usually condition of the anterior femur is robust. In this group *A. paradecolor* is found at the base of the clade.

The sister-group relationship between *A. picteti* + *A. assoi* and *A. insularis* is supported by four characters:

Ch. 5:1. Fore coxa with internal apical equal lobes, this character is an apomorphie because usually between the Mantodea these lobes are unequal.

Ch. 14:1. Distal margin of supranal plate is acute. This character is found only in this group.

Ch. 17:1 Cerci with flattened segments. Also this character is found only in this group. In the Amelinii the segments usually are cylindrical.

Ch. 18:1 Cerci going beyond the apex of the subgenital plate.

*A. picteti* and *A. assoi* are a sister-species favoured by the following character:

Ch.8:2 Posterior metatarsus is shorter than the 2nd segment. The evolutionary tendency to posterior metatarsus shortening is present in *Ameles* (Uvarov 1936). At the base of the group is found *A. insularis* n.sp.

### Taxonomic history

Burmeister (1838) erected the genus *Ameles* for *Mantis nana* Charpentier, 1825 from Portugal; many additional species were subsequently described. Saussure (1870) included *Ameles* into the tribe "Mantiens" listing the following six species: *A. wagneri* Ritter, *A. brevipennis* Yersin, *A. mexicana* Saussure, *A. spallanzania* Rossi, *A. decolor* Charpentier and *A. picteti* (Saussure) as well as two additional species of uncertain systematic position: *Mantis limbata* Brullè and *Mantis gracilis* Brullè. Giglio-Tos (1927), included *Ameles* in the group *Ameles* of the subfamily Amelinae, and listed 16 species: *A. gracilis* Brullè, *A. soror* (Serville), *A. abjecta* (Cyrillo), *A. africana* Bolivar, *A. persa* Bolivar, *A. decolor* (Charpentier), *A. kervillei* Bolivar, *A. modesta* (Bolivar), *A. limbata* Brullè, *A. brevis* Rambur, *A. syriensis* Giglio-Tos, *A. aegyptiaca* Werner, *A. nana* (Charpentier), *A. assoi* Bolivar, *A. heldreichi* Brunner and *A. taurica* Jakovlev. Later on, Chopard (1943) in his study of the Orthopteroids from North-Africa, added the following three species to Giglio-Tos's records: *A. dumonti* n. sp., *A. maroccana* Uvarov, 1930 and *A. moralesi* Bolivar, 1936. Kaltenbach (1963, 1976) made a significant revision of the European species using, for the first time, the characters found in the male genitalia to distinguish among species. He considered *A. abjecta*, *A. brevis*, *A. nana* and *A. soror* as synonyms of *A. spallanzania* and *A. taurica* as a subspecies of *A. heldreichi*; in the same publication he described *A. fasciipennis* from the Peninsula of Tolentino (Marche) in Italy. More recently the following have been described *A. wadisirhani* Kaltenbach, 1982 from Arabia, *A. poggii* Lombardo, 1986, from Libya and *A. massai* Battiston & Fontana, 2005 from Jordan.

Summarizing, the genus *Ameles* includes the following species:

–*A. spallanzania* (Rossi, 1792) (Mediterranean basin)

–*A. decolor* (Charpentier, 1825) (Mediterranean basin).

–*A. aegyptiaca* Werner, 1913 (Egypt).

–*A. africana* Bolivar, 1914 (Morocco, Algeria, Tunisia, Corsica, Sardinia, Sicily, Spain, Portugal).

–*A. assoi* (Bolivar, 1873) (Spain, Morocco).

–*A. limbata* Brullè, 1840 (Canary Islands).

–*A. gracilis* Brullè, 1840 (Canary Islands).

–*A. picteti* (Saussure, 1869) (Spain, Algeria, Sicily).

–*A. heldreichi* Brunner, 1882 (regions of the Mediterranean basin, from the Balkan peninsular to the Caspian Sea).

–*A. heldreichi taurica* Jakovlev, 1903 (Crimea).

–*A. kervillei* Bolivar, 1911 (Lebanon, Egypt).

–*A. persa* Bolivar, 1911 (Iran).

–*A. modesta* (Bolivar, 1914) (Morocco).

–*A. syriensis* Giglio-Tos, 1915 (Syria).

–*A. maroccana* Uvarov, 1931 (Morocco: Middle Atlas).

–*A. fasciipennis* Kaltenbach, 1963 (Italy: Tolentino, Marche).

–*A. moralesi* Bolivar, 1936 (Morocco: Sidi Ifni).

–*A. cypria* Uvarov, 1936 (Cyprus).

–*A. arabica* Uvarov, 1939 (Arabia).

–*A. dumonti* Chopard, 1943 (Tunisia).

–*A. moralesi confusa* Morales, 1948 (Morocco: Muley Rechid)

–*A. wadisirhani* Kaltenbach, 1982 (Saudi Arabia).

–*A. poggi* Lombardo, 1986 (Libya).

–*A. massai* Battiston & Fontana 2005 (Jordan).

Of all these species, some such as *A. limbata* Brullè and *A. gracilis* Brullè from the Canary Islands, *A. moralesi* Bolivar from Atlantis coast of Morocco, *A. arabica* Uvarov and *A. wadisirhani* Kaltenbach from Arabia, *A. persa* Bolivar from Iran, will not be discussed here because they do not belong to the Mediterranean fauna. Regarding *A. maroccana* Uvarov, its placement within *Ameles* is questionable and it would probably find a better place within *Pseudoversinia* Kirby, as it shares the typical characters of this genus.

### Taxonomic treatment

#### Genus *Ameles* Burmeister

*Mantis nana* Charpentier, 1825: 91.

*Ameles* Burmeister, 1838: 531.

=*Parameles* Saussure, 1869: 59.

#### DIAGNOSIS.

Small in size, body slender in the male, more or less stout in the female; green or ochre in colour. Head transverse, eyes conical or rounded, with or without apical tubercle; ocelli large and prominent in the male, (except in *A. paradecolor* where they are smaller) small in the female; antennae with short hairs; frontal shield transverse. Pronotum robust (LP/DW <2) or slender (LP/DW > 2), supracoxal dilation more or less developed; metazone only a little longer than the prozone. Anterior femora robust or slender with 4 external spines, 4 discoidal spines and 10 internal spines. Anterior tibiae with 8-9 external and internal spines. Middle and posterior legs slender with short or long hairs. Metatarsus of the hind legs at most a little longer than the second segment of the tarsus. Wings well developed, extending beyond abdomen in the male, very short in the female and with a large brown spot on the metathoracic wings. Abdomen cylindrical in the male, often rhomboidal in shape in the female. Supranal plate short, triangular in shape. External male genitalia of the male well sclerotized: ventral phallomere with bidentate distal process; phalloid apophysis well developed and S-like.

**KEY TO SPECIES**

**Males (not known for *A. kervillei*)**

- 1 Ratio pronotum length/maximum width <2 ..... 2
- Ratio pronotum length/maximum width >2 ..... 4
- 2 Eyes ovoid with an apical spine ..... 3
- Eyes rounded and without an apical spine .....  
..... *A. aegyptiaca*
- 3 Phalloid apophysis with a short apical spine .....  
..... *A. spallanzania*
- Phalloid apophysis with long apical spine .....  
..... *A. fasciipennis*
- 4 Rounded eyes without apical spine ..... 5
- Conical eyes with apical spine ..... 6
- Ovoid eyes with apical spine ..... 7
- 5 Eyes rounded but no prominent ..... *A. paradecolor*
- Eyes rounded but prominent ..... *A. insularis*
- 6 Elliptical eyes, with a well developed apical spine .....  
..... *A. picteti*
- Eyes less acute, with a small ocular spine ..... *A. assoi*
- 7 Posterior legs with long hairs ..... 8
- Posterior legs with short hairs ..... 9
- 8 Eyes with a distinct ocular spine; distal process of the  
ventral phallomere bidentated with both teeth of equal  
size ..... *A. syriensis*
- Eyes with a small granule; distal process of the ventral  
phallomere bidentate with the anterior tooth larger .....  
..... *A. poggii*
- 9 Longitudinal veins at intervals blackish and ochraceous  
..... 10
- Longitudinal veins uniformly ochraceous ..... *A. decolor*
- 10 Eyes more ovoid with a distinct ocular spine .....  
..... *A. heldreichi*
- Eyes less ovoid with a small ocular spine ..... *A. dumonti*

**Females (not known for *A. poggii*, *A. fasciipennis*,  
*A. insularis*, *A. dumonti*)**

- 1 Ratio pronotum length and its maximum width <2 ..... 2
- Ratio pronotum length and its maximum width >2 ..... 4
- 2 Lateral margins of pronotum smooth .... *A. spallanzania*
- Lateral margins of pronotum denticulated ..... 3
- 3 Vertex of head trilobate ..... *A. kervillei*
- Vertex without lobes ..... *A. aegyptiaca*
- 4 Eyes rounded ..... 5
- Eyes ovoid ..... 6
- 5 Lateral margins of pronotum slightly denticulated .....  
..... *A. decolor*
- Lateral margins smooth ..... *A. paradecolor*
- 6 Eyes very conical with a long ocular spine ..... *A. picteti*
- Eyes more ovoid with a small ocular spine ..... 7
- 7 Last segment of cerci flattened ..... *A. assoi*
- Last segment of cerci conical ..... 8
- 8 Lateral margins of pronotum with black teeth .....  
..... *A. heldreichi*
- Lateral margins of pronotum with ochraceous teeth .....  
..... *A. syriensis*

**LIST OF SPECIES**

**1. *Ameles spallanzania* (Rossi, 1792).**

- Mantis spallanzania* Rossi, 1792: 102-103 (orig. descr.); Fisher, 1853.  
*Mantis nana* Charpentier, 1825 : 91 (orig. descr.).  
*Mantis brevis* Rambur, 1838 : 21 (orig. descr.).  
*Mantis soror* Serville, 1839 : 200 (orig. descr.).  
*Ameles abjecta* Bolivar, 1897: 204 (nec. *Mantis abjecta* Cyrillo, 1787).  
*Ameles africana* Bolivar, 1914: 178 (n. syn.).  
*Ameles modesta* Bolivar, 1914: 178-179 (n. syn.).

**NEOTYPE DESIGNATION.** Unfortunately, the holotype of *A. spallanzania* has been lost, therefore, we have taken a male and female from Campania (Italy) and indicated them as the neotypes.

**MATERIAL EXAMINED:** NEOTYPE, male, Naples (ITALY) (coll. Lombardo) (MDBU). ALLONEOTYPE, female, same locality as the neotype (coll. Lombardo) (MDBU).

**OTHER MATERIAL EXAMINED. ITALY: Tuscany:** Siena 2 ♀ (leg. Lombardo) (coll. Lombardo) (MDBU); Elba IX-52, 1 ♀ (coll. Lombardo) (MDBU); Elba 18/30-IX-69, 1 ♀ (leg. J. A. J e D.J. Clark) (NHML); Giglio, Scopeto 5/6-IX-57, 4 ♂ (leg. Baccetti) (coll. Baccetti); Giglio, Porto 7-IX-55, 1 ♂ (leg. Baccetti) (coll. Baccetti). **Sardinia:** Assemisi 13-XI-62, 1 ♀ (coll. Lombardo) (MDBU); Sassari 15-8-56, 1 ♀ (MDBU); S. Antioco 15-VII-58, 1 ♀ (coll. Lombardo) (MDBU); Sassari 10-X-57, 1 ♀ (coll. Lombardo) (MDBU); Sassari, Valle Muscau 12-XI-48, 1 ♀ (leg. Servadei) (coll. Lombardo) (MDBU); Mogono 1950, 1 ♀ (coll. La Greca) (MCSN); Is. Maddalena, Spalmatore 7-IX-75, 1 ♂ (leg. Baccetti) (coll. Baccetti); Asuni 1910, 1 ♂ (leg. Kraussè) (NHML); Nuoro, Posada 2-VI-99, 3 ♂ (leg. Poggi) (MCSN); Iglesias, Acqua Resi 2-VI-64, 2 ♂ (leg. La Greca) (coll. La Greca) (MCSN); Aritzo Suprano 14-VIII-73, 2 ♂ (coll. Lombardo) (MDBU); Ottana 11-X-74, 1 ♂ (coll. Lombardo) (MDBU); Sassari VIII-48, 1 ♂ (leg. Servadei) (coll. Lombardo) (MDBU); Siniscola 9-VIII-72, 1 ♂ (coll. Lombardo) (MDBU). **Campania:** Ponza Gianco 21-VI-66, 2 ♂ (leg. Sbordoni) (coll. Lombardo) (MDBU); Ponza Guardia 18-VI-66, 1 ♂ (coll. Lombardo) (MDBU). **Apulia:** Lecce, Poggiardo 17-VII-57, 1 ♀ (coll. Lombardo) (MDBU); Bari 20-VII-57, 1 ♂ (coll. Lombardo) (MDBU). **Basilicata:** Potenza 4-IX-56, 1 ♂ (coll. Lombardo) (MDBU); Venosa 30-IX-37, 1 ♂ (leg. F. E. Zeuner) (NHML). **Calabria:** Savambucco, Cozzo della Vitalba Sila 3-IX-48, 1 ♀ (coll. Lombardo) (MDBU). **Sicily:** Pedara, M.t. Troina 600m, 25-X-48, 3 ♀ (leg. Tomaselli) (MDBU); Linguaglossa 29-V-86, 1 ♂ (leg. Lombardo) (coll. Lombardo) (MDBU); Bosco di Paternò, Ragalna 29-IX-85, 2 ♂ (leg. Fassari) (coll. Lombardo) (MDBU); Vizzini 25-VIII-63, 2 ♂ (coll. La Greca) (MCSN); Niscemi 1-VII-84, 1 ♂ (leg. Lombardo) (MDBU); Licodia Eubea 15-IX-79, 1 ♂ (leg. Lombardo) (MDBU); Capo Calavà 22-VIII-57, 1 ♀ (coll. Lombardo) (MDBU); Portella Mandrazzi (Peloritani 1000m) 23-VII-61, 1 ♀ (leg. La Greca) (MDBU); Floresta (Nebrodi) 11-IX-69, 1 ♂ (leg. La Greca) (MDBU); Catania 7-XI-76, 1 ♂ (leg. La Greca) (MDBU); Agrigento, Marina di Palma 24-IV-84, 1 ♀ (leg. Lombardo) (MDBU); Bivona 18-V-63, 1 ♀ (coll. La Greca) (MCSN); Bisacquino Mt. Genuardo 800m 18-VI-62, 1 ♂ larva (leg. La Greca) (MDBU); Vizzini 25-VIII-63, 2 ♂ (coll. La Greca) (MCSN); Priolo 4-X-84, 1 ♀ (leg. Lombardo) (MDBU); Portopalo 1969, 1 ♂ (leg. Costa)

(MDBU); Fontane Bianche 1 ♂ (MDBU); Vendicari V-98, 1 ♂ (leg. Lombardo) (MDBU); Riserva dello Zingaro 14-IX-85, 4 ♂ (leg. Lombardo) (MDBU); Mazzara del Vallo, 6-X-67, 1 ♂ (leg. Ronsisvalle) (MDBU); Is. Egadi, Levanzo VI-68, 1 ♂ (leg. Osella) (MDBU); Is. Eolie Panarea 22-VIII-67, 1 ♂ (leg. Sulfaro) (MDBU); Stromboli 15-IX-68, 1 ♂ (leg. Nobile) (MDBU).

**FRENCH:** Valescure 2-VII-69, 1 ♂ (leg. Guichard) (NHML); Corsica, Ciriudinu, IX-1992, 1 ♂ (leg. M. Condemin) (MNHN); Le Crau, VII-1949, 1 ♂ (leg. Reton des Aers) (MNHN); Hercult la Gardiol, IX-1941, 1 ♀ (leg. Bauzille) (MNHN); Fejius, 20 -IX- 1928, 1 ♂, 1 ♀ (MNHN).

**SPAIN:** Bulla 21-VI-70, 1 ♂ (leg. Popov) (NHML); Cuenca, 1987, 1 ♂ (leg. Pantel) (MNHN); Andalucia, Huelva Coto Donana 5-VI-57, 1 ♀ (leg. Mountfort) (NHML); Sierra de Guadarrama, Cercile, 1 ♂ (leg. Chopard) (MNHN).

**PORTUGAL:** Algarve, Barranco do Velho, 17-VI-77, 1 ♂ (leg. Pitkin) (NHML).

**MALTA:** 16-VIII-70, 1 ♀ (MDBU); 19-7-72, 1 ♀, 2 ♂ (MDBU).

**MOROCCO:** Grande Atlas, Timmel, Goundafa 17-V-1927, 2 ♂ (leg. Cerf & Talbot) (MNHN).

**TUNISIA:** Ain Draham 20-X-84, 1 ♀ (leg. Lombardo) (MDBU); Tabarka 17-X-89, 1 ♀ (leg. Lombardo) (MDBU).

**ALGERIA:** Bouria (= Bouge) 23-V-81, 3 ♂, (MRSN); Col. Du Melab 6-XI-84, 1 ♀ (leg. Lombardo) (MDBU); Louhohou, 1 ♂, 1 ♀ (leg. Tondu) (MNHN); Thery, VIII-1930, 1 ♂ (MNHN).

**DIAGNOSIS.** Small in size, males from 25 to 40 mm and females from 18 to 27 mm, ochre or green in colour; eyes more or less ovoid with a small apical tubercle. Pronotum short (ratio PL/SDW <2); male with anterior margin of tegminae with a narrow white longitudinal strip and brown costal area. Female with wings reaching distal margin of first urotergite. Abdomen cylindrical in males, enlarged and rhomboid in females.

#### DESCRIPTION:

**Male. Head.** 0.9 times as wide as pronotal supracoxal dilation. Eyes more or less ovoid with a small apical tubercle (Fig. 3 c-h); vertex arcuated, lower than imaginary line joining apex of eyes; frontal shield transverse, upper margin more or less rounded (Fig. 3i-n).

**Thorax.** Pronotum (Fig. 3a) 1.7 times as long as its maximum width and 2.81 times as long as its minimum width; lateral margins smooth; pronotal supracoxal dilation rounded and distinct; metazone with arcuated lateral margins; metazone 1.47 times as long as prozone. Anterior legs robust: coxae 0.88 times as long as the length of pronotum; femora (Fig. 2a) about 3.3 times as long as their maximum width. Tibiae 0.77 times as long as the length of pronotum with 9 internal and external spines. Hind and posterior legs slender and bearing short hairs. Meso- and metathoracic wings well developed. Tegminae 4.3 times as long as pronotum, hyaline, green or brown with a narrow white strip on external anterior margin.

**Abdomen.** Cylindrical. Supranal plate transverse with rounded distal margin. Cerci with 9 short cylindrical segments except the last conical one.

**External male genitalia.** Ventral phallomere rhomboidal (Fig. 4a). 1.55 times longer than its width; distal process

bidentate with the anterior tooth larger separated from the posterior one by a variable deep incision (Fig. 4 b-q). Left phallomere well sclerotized (Fig. 5a): dorsal lamina large with numerous short spines; phalloid apophysis (Fig. 5 b-e) sinuous with a robust process on anterior right side and with a membranous posterior lobe with a small spine, sometimes indistinct, on the dorsal margin.

**Female. Head.** 0.91 times as wide as pronotal supracoxal dilation. Eyes moderately ovoid with a small apical tubercle (Fig. 3b); vertex arcuated, higher than imaginary line joining apex of eyes; ocelli small, frontal shield transverse.

**Thorax.** Pronotum short (Fig. 3b), 1.57 times as long as its maximum width and 2.62 times as long as its minimum width; lateral margins moderately denticulated; pronotal supracoxal dilation rounded and well distinct. Anterior legs more robust than the male: external margins of coxae very spinulated. Femora 1.8 times as long as the length of the pronotum (Fig. 2n). Meso- and metathoracic legs slender with short hairs. Meso- and metathoracic wings not extending beyond the distal margin of the 1<sup>st</sup> urotergite.

**Abdomen.** Rhomboid. Supranal lamina transverse with rounded distal margin. Cerci with 9 short cylindrical segments except the last conical one.

**REMARKS.** This species, within of the genus *Ameles*, has the maximum plasticity, therefore its limits of variability are extremely wide. The examination of a large number of co-specific individuals (no correlation between morphological variation including male genitalia) and geographic distribution was observed in our material.

The most variable morphological characters and the extent of its variation is explained as follows

– *shape of eyes*. In *A. spallanzania* there is a tendency to pass from an ovoid shape with a distinct apical tubercle to a less ovoid shape, with a lesser apical tubercle. (Fig. 3c-h).

– *frontal shield*. The upper angle of the frontal shield can be either acute or widely rounded and between these two extremes there is a whole series of intermediate shapes (Fig. 3i-n). This heterogeneity is found also in specimens hatched from the same ootheca.

– *distal process of ventral phallomere*. The incision separating the two apical teeth (Fig. 4b-q) is extremely variable also in specimens born from the same ootheca.

This wide variability made Bolivar (1914) to describe *A. modesta* and *A. africana* from Morocco, both related to *A. spallanzania*. Whereas *A. africana* is distinguished by the frontal shield with angled vertex, *A. modesta* is distinguished above all by less ovoid eyes. Based on our observations and considering that the distinctive characters of *A. africana* and *A. modesta* fall within the range of variability observed in *A. spallanzania*, we consider the former two species as synonyms of *A. spallanzania*.

**BIOLOGY.** In the area of Sicily, the adults are active between July and November. During this period they have two generations and the specimens of the second generation often hibernate in cracks or under stones and re-emerge at the beginning of June of the following year.

**DISTRIBUTION.** The species has a Mediterranean- Maghrebian distribution (Fig. 19).

## 2. *Ameles decolor* (Charpentier), 1825.

*Mantis decolor* Charpentier, 1825 (orig. descr.).

*Harpax decolor* Lucas, 1849.

**MATERIAL EXAMINED: ITALY:** **Liguria:** Genova Chiappeto 16-IX, 1 ♂ (leg. Capra) (MCSN); 15-VIII-53 1 ♂ (leg. Capra) (MCSN); Genova 11-IX-32, 1 ♀ (leg. Capra) (MCSN). **Tuscany:** Siena VIII-74, 2 ♀ (leg. Oxiger) (coll. Lombardo) (MDBU); Is. di Montecristo 10-VIII-84, 1 ♂ (leg. Baccetti) (coll. Baccetti). **Abruzzo:** Gran Sasso d'Italia, Castel del Monte 1300 m 1/10-X-58, 1 ♂ (leg. Baccetti) (coll. Baccetti). **Apulia:** Boragiano Muro Leccese 26-IX-76, 1 ♀ (leg. Messina) (coll. Lombardo) (MDBU); Altamura (Bari) 20-VIII-57, 1 ♀ (coll. Lombardo) (MDBU); Poggiardo Lecce 7-IX-56, 1 ♂ (coll. Lombardo) (MDBU); Poggiardo Lecce 17-VIII-57, 1 ♀ (coll. Lombardo) (MDBU); Lecce Maglie, 7-IX-56 1 ♂ (coll. Lombardo) (MDBU). **Basilicata:** Oliveto Lucano Citra 23-IX-76, 1 ♀ (leg. Messina) (coll. Lombardo) (MDBU). **Calabria:** Vibo Valentia 3-IX-71, 1 ♂ (leg. Messina) (coll. Lombardo) (MDBU). **Sicily:** Mt. Lauro 9-VIII-1985, 3 ♀, 6 ♂ (leg. Lombardo) (coll. Lombardo) (MDBU); Noto S. Marco 22-VIII-78, 1 ♂ (leg. Messina) (MDBU); Bosco di Nicolosi 14-X-63, 2 ♀ (leg. Marcellino) (coll. Lombardo) (MDBU); Randazzo, 1 ♂; Mt. Minardo 1200 m 9-IX-74, 2 ♀ (leg. Motta) (coll. Lombardo) (MDBU); Riserva dello Zingaro, 14-IX-85, 2 ♀ (leg. Lombardo) (coll. Lombardo) (MDBU); Contrada Paviglione 1200m 1-X-84, 3 ♀ (leg. Lombardo) (coll. Lombardo) (MDBU); Maniace 600m 20-IX-76, 2 ♀ (leg. Sottile) (coll. Lombardo) (MDBU); Cesarò 12-X-90, 1 ♂; Novara di Sicilia 10-X-83, 2 ♀ (leg. Lombardo) (coll. Lombardo) (MDBU); Mandanici 700m 2-IX-60, 1 ♀, 1 ♂ (leg. La Greca) (coll. La Greca) (MCSN). **FRENCH:** Callian 1921, 2 ♂ (leg. Bernard) (MNHN); San Raphael, Var Jeannel, 1931, 2 ♂ (leg. Cavaliere D'Cleux) (MNHN); La Bonde Fagniez, 1 ♂ (leg. Aout) (MNHN); Bagnois, 27-IX-1986, 1 ♀ (leg. Azam, det. Finot) (MNHN); Corsica, Bonifacio, 1912, 1 ♀ (leg. Chopard) (MNHN); Corsica, Ajaccio, 1912, 1 ♀ (leg. Chopard) (MNHN). **GREECE:** Corfu Visitanos 4-IX-83, 5 ♀ (leg. Lombardo) (MDBU).

**DIAGNOSIS.** Small in size, males from 18 to 27 mm, females from 19 to 28 mm: ochre in colour; eyes rounded rarely with a small apical tubercle. Pronotum slender (ratio PL/SDW >2). Male tegminae extending beyond the apex of subgenital plate, costal area with a narrow white longitudinal marginal strip. Female with the wings reaching distal margin of the first urotergite. Male and female abdomen cylindrical.

### DESCRIPTION:

**Male. Head.** 0.76 times as wide as supracoxal dilation. Eyes moderately rounded rarely with a small granule (Fig. 6 a); vertex straight, lower than imaginary line joining apex of eyes; frontal shield transverse, upper margin rounded (Fig. 6c).

**Thorax.** Pronotum (Fig. 6a) about 2.15 times as long as its maximum width and 2.81 times as long as its minimum width; lateral margins smooth with sparse fine hairs; supracoxal dilation rounded; metazone 1.5 times as long as prozone. Anterior legs slender: coxae 0.65 times as long as pronotum, prismatic with triangular section; femora 0.90 times as long as pronotum and about 3.84 times as long as their maximum width (Fig. 2e). Tibiae 0.61 times as long as

pronotum with 9 internal and external ochre spines. Middle and hind legs slender bearing dense short hairs. Meso- and metathoracic wings well developed. Tegminae 3.9 times as long as pronotum, hyaline with a narrow white strip on the external anterior margin.

**Abdomen.** Cylindrical, urosternites longer than wide. Supranal lamina transverse with rounded distal margin; cerci with 8 short cylindrical segments except the last conical one.

**External male genitalia.** Ventral phallomere (Fig. 7a) rhomboidal 1.77 times longer than its width; distal process bidentate with gibbosus posterior margin (Fig. 7b-i). Left phallomere well sclerotized: dorsal lamina large with numerous short spines (Fig. 8a); phalloid apophysis (Fig. 8b-d) sinuous with a robust process on anterior right side and with membranous distal branch.

**Female. Head.** 0.77 times as wide as pronotal supracoxal dilation. Eyes similar to male (Fig. 6b); vertex arcuated more elevated than imaginary line joining apex of eyes; ocelli small, frontal shield transverse, upper margin rounded (Fig. 6d).

**Thorax.** Pronotum (Fig. 6b) 2.05 times as long as its maximum width and 3.4 times as long as its minimum width; lateral margins smooth; supracoxal dilation rounded. Anterior legs more robust than the male: coxae with very spinulated external margins. Femora 1.4 times as long as pronotum (Fig. 2q). Middle and posterior legs slender with short hairs. Meso- and metathoracic wings not extending beyond the distal margin of the 1<sup>st</sup> urotergite.

**Abdomen.** Elongated and narrow. Supranal lamina transverse with rounded distal margin. Cerci with 9 short cylindrical segments except the last conical one.

**REMARKS.** This species is near to *A. heldreichi* from which it differs for its more rounded eyes and for the more elongated phalloid apophysis (Fig. 8 a-d, 12 d-i).

**DISTRIBUTION.** *A. decolor* is known from Algeria, France, Italy, Macedonia, Greece, Ionian Islands and Spain (Fig. 21).

**BIOLOGY.** *A. decolor* is a very common species found in the herbaceous vegetation of grassland zones or woods, contrary to *A. spallanzania*, prefers cool habitats. The ootheca is always secreted under stones. In Sicily the adults can be found from July to October.

## 3. *Ameles picteti* (Saussure, 1869)

*Parameles picteti* Saussure 1869 (orig. descr.).

*A. nana* Brunner V.W. (nec. *Mantis nana* Charpentier, 1825).

**MATERIAL EXAMINED: SPAIN:** Andalusia, Marbella 10.1963, ♂ (leg. J.P. Vandriès) (MNHN); Marbella 26.6.1964, 1 ♂ (leg. A Bégard) (MNHN).

**ALGERIA:** Hammam Bou Hadjar, 2 ♂ (NHML); Oran, 1 ♀ (coll. Finot) (MNHN); Sidi Bel Abbes 1 ♂ (coll. Le Moulton) (MNHN).

**DIAGNOSIS.** Small in size, males from 30 to 33 mm and females 35 mm. ochre or green in colour; eyes very ovoid with a distinct apical tubercle. Pronotum very slender (ratio PL/SDW >2). Anterior femora very slender. Tegminae of the males extending beyond the apex of subgenital plate, costal area with a narrow white longitudinal marginal strip. Female with the wings reaching distal margin of the first urotergite. Abdomen cylindrical; Cerci very long going beyond the apex of subgenital-plate.

## DESCRIPTION:

**Male. Head.** 0.69 times as wide as supracoxal dilation. Eyes very ovoid with a distinct apical tubercle longer than wide (Fig. 9a); vertex straight, lower than imaginary line joining apex of eyes; frontal shield transverse, upper edge acute.

**Thorax.** Pronotum short (Fig.9a) 2.5 times as long as its maximum width and 4.15 times as long as its minimum width; lateral margins smooth; supracoxal dilation weakly developed. Anterior legs very slender: coxae 0.79 times as long as pronotum, prismatic with triangular section; femora 0.90 times as long as pronotum and about 4.45 times as long as their maximum width (Fig.21). Tibiae 0.61 times as long as pronotum with 9 internal and external ochre spines. Middle and hind legs slender, bearing short hairs. Meso- and metathoracic wings well developed. Tegminae 1.42 times as long as pronotum, hyaline with sub-rounded apex; costal field with a narrow white strip.

**Abdomen.** Cylindrical. Supranal plate triangular, transverse with acute apex. Cerci with 12 cylindrical segments except the last flattened one.

**External male genitalia.** Ventral phallomere rhomboidal 1.72 times as long as its width; distal process short with two teeth separated by a wide incision (Fig. 10a). Left phallomere well sclerotized (Fig. 10b-e): dorsal lamina wide with numerous short spines; phalloid apophysis well developed: anterior branch with a not well developed process on anterior right side; posterior branch membranous with a small dorsal spine.

**Female. Head.** 0.59 times as wide as pronotal supracoxal dilation. Eyes markedly ovoidal with an apical tubercle (Fig. 9b); vertex arcuated, more elevated than imaginary line joining apex of eyes; ocelli small, frontal shield transverse, upper margin acute.

**Thorax.** Pronotum (Fig.9b), 2.53 times as long as its maximum width and 3.6 times as long as its minimum width; lateral margins smooth; supracoxal dilation no distinct; metazone 1.45 times as long as prozone. Anterior legs more robust than those of the male: coxae 0.72 times as long as pronotum with spinulated margins. Femora 0.92 times as long as pronotum (Fig.2u). Middle and hind legs slender bearing short hairs. Meso- and metathoracic wings not extending beyond the distal margin of the 1<sup>st</sup> urotergite.

**Abdomen.** Cylindrical; supranal plate transverse with acute apex.

**REMARKS.** This species is near to *A. assoi* from which it can be distinguished by having more ovoid eyes, more developed apical tubercle eyes and a different development of the teeth of the ventral phallomere (Figs. 10 a, f).

**DISTRIBUTION.** In the past this species was also recorded for Sicily and more recently for Lampedusa Island (Battiston & Fontana, 2005). In all the years of research in Sicily we have never found individuals belonging to this species. Therefore we consider that *A. picteti* should be removed from the fauna of Sicily and the surrounding islands. Perhaps these records actually refer to *A. decolor*. Therefore, this species is distributed in Spain and in Algeria (Fig. 20).

## 4. *Ameles assoi* (Bolivar, 1873)

*Mantis assoi* Bolivar, 1873 (orig. descr.).

*A. nana* Brunner V.W. (nec. *Mantis nana* Charpentier, 1825).

*Ameles assoi mellilensis* Bolivar, 1914.

**MATERIAL EXAMINATED: SPAIN:** Granada 9-VI-77, 2 ♂, (leg. D. e R. Ragge) (NHML); Madrid, Puerto de Galapagar 7-VI-84, 2 ♂, 1 ♀, (leg. D. e R. Ragge) (NHML); Jaén Sierra de Cazorla Nava del Espino 29-VIII-6, IX-63, 1 ♂, (leg. P. M. Newman e A. Bown) (NHML); Madrid 1898, 3 ♂, 1 ♀ (leg. Bolivar) (MNHN); Montarco, 1930, 1 ♂, 1 ♀ (leg. Bolivar) (MNHN); Montarco, Arias 6.1908, 1 ♂ (coll. Chopard) (MNHN); Ucles, 1 ♀ (coll. Chopard) (MNHN); Ribas 6.1908, 1 ♂ (coll. Chopard) (MNHN).

**DIAGNOSIS.** Small in size, males from 24 to 28 mm and females from 26 to 29 mm, ochre or green in colour; eyes less ovoid than *A. picteti* with an apical tubercle. Pronotum less slender than *A. picteti* (ratio PL/SDW>2). Male tegminae extending beyond the apex of subgenital plate. Female with wings reaching distal margin of the first urotergite. Male and female abdomen cylindrical; Cerci very long, extending beyond the apex of subgenital-plate.

## DESCRIPTION:

**Male. Head.** 0.64 times as wide as pronotal supracoxal dilation. Eyes ovoid with a distinct apical tubercle (Fig. 9c); vertex straight, lower than imaginary line joining apex of eyes; frontal shield transverse, upper margin acute.

**Thorax.** Pronotum short, 2.58 times as long as its maximum width and 3.55 times as long as its minimum width (Fig.9c); lateral margins smooth; supracoxal dilation not well developed. Anterior legs very slender: coxae 0.75 times as long as the pronotum, prismatic with triangular section; femurs 0.97 times as long as pronotum and about 4.97 times as long as their maximum width (Fig. 2i). Tibiae 0.46 times as long as the pronotum with 9 internal and external spines. Middle and hind legs slender bearing dense short hairs. Meso- and metathoracic wings well developed. Tegminae 3.62 times as long as the pronotum, hyaline with rounded apex, costal field with a narrow white strip.

**Abdomen.** Cylindrical. Supranal lamina triangular with acute apex. Cerci with 10 cylindrical segments except the last, flattened one.

**External male genitalia.** Ventral phallomere rhomboidal, 1.53 times as long as its width; distal process short with two teeth of which the dorsal one is more developed (Fig.10f). Left phallomere well sclerotized (Fig. 10g-i): dorsal lamina wide with numerous short spines; ventral lamina narrow with membranous lobe with long and dense hairs; phalloid apophysis with the anterior branch with a well sclerotized process on anterior right side and posterior branch membranous with a small dorsal spine.

**Female. Head.** 0.68 times as wide as pronotum. Eyes similar to male; vertex arcuated, higher than imaginary line joining apex of eyes (Fig. 9d); ocelli small, frontal shield transverse, upper margin acute.

**Thorax.** Pronotum (Fig. 9d) 2.1 times as long as its maximum width and 3.6 times as long as its minimum width; lateral margins smooth; pronotal supracoxal dilation no distinct; metazone 1.54 times as long as prozone. Anterior legs more robust than the male: coxae 0.68 times as long as pronotum with spinulated margins. Femora similar to male, 0.89 times as long as pronotum (Fig. 2t). Middle and hind legs slender with short hairs. Meso- and metathoracic wings not extending beyond the distal margin of the 1<sup>st</sup> urotergite.

**Abdomen.** Elongated and narrow; supranal lamina similar to male.

**DISTRIBUTION.** This species is known for Spain, Morocco, and Tunisia, although this last record still needs to be confirmed. (Fig. 20).

##### 5. *Ameles heldreichi* Burmeister, 1882.

*Ameles heldreichi* Brunner, 1882 (orig. descr.).

*Parameles h.*, Jacobson & Bianchi, 1905.

*P. taurica* Jakovlev, 1903.

*P. picteti*, Giglio-Tos, 1914 (nec *P. picteti* Saussure, 1869).

*Apterameles rammei* Beier, 1950.

*Ameles cypria* Uvarov, 1936a (n. syn.).

**MATERIAL EXAMINATED: YUGOSLAVIA:** Izvor 8-IX-64, 1 ♀ (leg. F. Willemse) (MNHN); Crna Gora Bloce Moraca, 18-IX-64, 1 ♀ (leg. F. Willemse) (MNHN); Cirenaiica R.U. Agario Sc. Laindemax 2 ♂ (leg. C. Krüger) (MCSN); Dalmatia Kuciste 1969 1 ♂ (leg. F. Willemse) (MNHN); Macedonia, Karaburun 23-VII-18, 1 ♀ (leg. M. Burr) (NHML); Macedonia Izvor 8-IX-64, 1 ♂ (leg. Willemse) (MNHN); Serbia Skopje Gornje Vodno 18-IX-1939, 1 ♀ (coll. M. Burr) (NHML); Serbia Pobuzji Koplje, 3-IX-39, 1 ♂ (Det. E. Miram) (NHML); Is Biscevo 24/25-VII-68, 1 ♀; (coll. Lombardo) (MDBU).

**BULGARIA:** Balkik 15-VIII-72, 1 ♂ (leg. R.M. & B.R.P.) (NHML); Apmerk 8-V-26, 1 ♀ (leg. H. Kysueyob) (NHML).

**GREECE:** Mt. Timfi, Papingo, 24-VIII-83 2 ♀, 1 ♂ (leg. Lombardo) (MDBU); Papingo 2-IX-83, 1 ♀ (leg. Lombardo) (MDBU); Rodi Trianda 16-V-32, 2 ♂ (leg. Schatzmayr) (NHML); Samotracia Therene, S. L. 15-VIII-62, 1 ♂ (leg. Guichard e Harvey) (NHML); Rodi 10/20-V-64, 1 ♂ (leg. M. Rothschild) (NHML); Cipro, Pera Pedi 9.VI.37, 2 ♂ (leg. G. A. Mavromostakis) (NHML); Polmedia Hills 14.XII.48, 1 ♀, (leg. G. A. Mavromostakis) (NHML); Zakaki, 21.X.48, 1 ♂ (leg. G. A. Mavromostakis) (NHML).

**TURKEY:** Prinkipo 13-IX-44, 2 ♂ (leg. M. Burr) (NHML); Istanbul Balta Liman 16/26-VIII-42, 1 ♂ (leg. M. Burr) (NHML); Anatolia, 1931, 1 ♂ (leg. Demirci) (NHML); Cmapa Wyru Krabcara 10-VIII-39, 1 ♂, (NHML).

**PALESTINE:** Haifa, 500f, 29-VII-19, 1 ♂, (leg. P. J. Borrand) (NHML); Gerusalemme 1-VI-22, 1 ♂ (leg. P. A. Buxton) (NHML).

**ISRAEL:** Nazareth 14-IX-35, 1 ♀, (NHML); Nazareth, 28-X-49, 1 ♀ (coll. M. Sternlich) (NHML); Jerusalem X-53, 1 ♀ (leg. J. Wahrman) (NHML).

**LEBANON:** Da Sofar a Mdering, 20-IX-55, 2 ♀ (coll. Lombardo) (MDBU); The Cedars of Bcharrè, 28-VIII-63, 1 ♀ (leg. Sbordoni) (coll. Lombardo) (MDBU); Giambur, 6-IX-55 1 ♀ (coll. Lombardo) (MDBU); Ablah 2.500 f 1-VI-45, 1 ♂ (leg. R. S. Bown) (NHML).

**JORDAN:** Amman (Yadisir) XI-1961, 1 ♀ (leg. Saccà) (MDBU).

**DIAGNOSIS.** Small in size, males from 22 to 28 mm and females from 23 to 30 mm, ochre in colour, similar to *A. decolor* but with an evident apical tubercle on conical eyes and distinct genitalia. Female with the wings reaching distal margin of the first urotergite. Abdomen cylindrical. Cerci no going beyond the apex of subgenital-plate.

##### DESCRIPTION.

**Male. Head.** 0.64 times as wide as pronotal supracoxal dilation with sparse black spots (Fig. 11a,c-e). Eyes ovoid with an apical tubercle; vertex straight, lower than imaginary line

joining apex of eyes; frontal shield transverse, upper margin acute.

**Thorax.** Pronotum (Fig. 11a) 2.2 times as long as its maximum width and 4.07 times as long as its minimum width; lateral margins smooth; supracoxal dilation not well developed; metazone 1.77 times as long as prozone with a median longitudinal carina. Anterior legs slender: coxae 0.67 times as long as pronotum, prismatic with triangular section; femora 0.88 times as long as pronotum and about 3.61 times as long as their maximum width (Fig. 2h). Tibiae 0.64 times as long as the length of pronotum with 9 internal and external spines. Middle and hind legs slender with short hairs. Meso- and metathoracic wings well developed. Tegmina 3.83 times as long as pronotum, hyaline with sub-rounded apex, costal field hyaline.

**Abdomen.** Cylindrical. Supranal plate small, triangular with rounded apex. Cerci with 8-9 cylindrical segments except the last conical one.

**External male genitalia.** Ventral phallomere rhomboidal 1.75 times as long as its width; distal process short with two apical teeth (Fig. 12a-c). Left phallomere well sclerotized (Fig. 12d-i); dorsal lamina wide with numerous short spines; ventral lamina narrow with a membranous lobe with long and dense hairs; phaloid apophysis with anterior branch with a well sclerotized process on anterior right side, posterior branch membranous.

**Female. Head.** 0.81 times as wide as pronotum (Fig. 11b). Eyes similar to male; vertex arcuated, higher than imaginary line joining apex of eyes; ocelli small, frontal shield transverse, upper margin acute.

**Thorax.** Pronotum (Fig. 11b) 1.83 times as long as its maximum width and 3.82 times as long as its minimum width; lateral margins moderately denticulated; pronotal supracoxal dilation no distinct; metazone 1.37 times as long as prozone. Anterior legs more robust than male: coxae 0.71 times as long as pronotum, margins spinulated. Femora similar to male, 0.94 X as long as pronotum (Fig. 2s). Middle and hind legs slender with short hairs. Meso- and metathoracic wings not extending beyond the distal margin of the 1<sup>st</sup> urotergite.

**Abdomen.** Cylindrical, supranal lamina similar to male.

**REMARKS.** Uvarov (1936) described *A. cypria*, from Cyprus, species that, as Uvarov himself stated, is very similar to *A. heldreichi*. In fact, the only notorious difference is that the eyes of *A. cypria* are more rounded than in *A. heldreichi*. We examined the holotype of *A. cypria* together to three males and one female from Cyprus and we verified variation in eyes shape (Fig. 11c-e). Furthermore, the comparison between the copulatory apparatus of the males from Cyprus and specimens of *A. heldreichi* did not show important differences. Therefore we believe that *A. cypria* must be considered a synonym of *A. heldreichi*.

**DISTRIBUTION.** This species is found in the eastern regions of the Mediterranean basin, from the Balkan peninsular to the Caspian Sea (Fig. 21).

##### 6. *Ameles kervillei* Bolivar, 1911.

*Ameles kervillei* Bolivar, 1911:1-2 (orig. descr.).

**MATERIAL EXAMINED: PALESTINE:** Jordan Valley, 1 ♀ Avril 1923 (leg. Buxton) (NHML); **JORDAN:** Wadi Jre'ha Mahes, 1 ♀, 11.04.05 (leg. Raed); Hummirit As Sahin, 1 ♀ 31.03.05 (leg. Omar); Al Karak, 1 ♀, 26.04.04 (leg. Omar).

**DIAGNOSIS.** Medium in size females from 24 to 28 mm, ochre in colour; eyes rounded without apical tubercle; frontal shield transverse. Pronotum short (ratio ratio PL/SDW <2; lateral margins denticulated. Wings reaching distal margin of the first urotergite. Abdomen cylindrical, tergites with a median apical tooth.

Male unknown.

#### **DESCRIPTION.**

**Female. Head.** 1.44 times as wide as pronotal supracoxal dilation, eyes rounded without apical tubercle (Fig. 13a); vertex arcuated lower than imaginary line joining apex of eyes; ocelli small, frontal shield transverse, upper margin more or less rounded.

**Thorax.** Pronotum short (Fig. 13a), 1.8 times as long as its maximum width and 2.3 times as long as its minimum width; lateral margins moderately denticulated; pronotal supracoxal dilation rounded and well developed; metazone with arcuated lateral margins 1.33 times as long as prozone. Coxae 0.85 times as long as pronotum, and external margins spinulated. Femora 1.08 times as long as pronotum, 3 times as wide as its maximum width (Fig. 2v). Middle and hind legs slender with short hairs. Meso- and metathoracic wings not extending beyond the distal margin of the 1<sup>st</sup> urotergite.

**Abdomen.** Cylindrical, urotergites with a median apical tooth; supranal lamina transverse with rounded distal margin.

**REMARKS.** This species was known only from the holotype description, thus the finding of four more female specimens attributable to the same taxon, allowed us to define the species better. In 2005 Battiston & Fontana described *A. massai* n.sp from Jordan, this new species shares with *A. kervillei* the same shape of eyes and the pronotum, therefore we hypothesize that *A. massai* can be a synonym of *A. kervillei*.

**DISTRIBUTION.** Known from Lebanon, Palestine and Jordan (Fig. 21).

#### **7. *Ameles aegyptiaca* Werner, 1913.**

*Ameles aegyptiaca* Werner, 1913 (orig. descr.)

**MATERIAL EXAMINATED: EGYPT:** Wadi Hof, 1916, 1 ♂ 1 ♀, 1980, (coll. Adair) (NHML).

**DIAGNOSIS.** Small in size, male 25 mm and female 22 mm, ochre in colour; eyes very rounded without apical tubercle. Pronotum short (ratio PL/SDW <2).

Male with a narrow longitudinal white strip on anterior margin of tegminae. Female with the wings reaching distal margin of the 1<sup>st</sup> urotergite. Female abdomen cylindrical, tergites with a median apical tooth.

#### **DESCRIPTION:**

**Male. Head.** 1.02 times as wide as pronotal supracoxal dilation; eyes globular; vertex arcuated, lower than imaginary line joining apex of eyes (Fig. 13b); frontal shield transverse, upper margin more or less rounded.

**Thorax.** Pronotum short, 1.7 times as long as its maximum width and 2.5 times as long as its minimum width (Fig. 13b); lateral margins smooth; supracoxal dilation rounded and well developed; metazone 1.45 times as long as prozone with arcuated lateral margins. Anterior coxae 0.94 times as long as pronotum, prismatic with triangular section; anterior femora

1.1 times as long as pronotum and 4 times as long as their maximum width (Fig. 2c). Tibiae 0.83 times as long as pronotum with 9 internal and external spines. Middle and hind legs slender with dense long hairs. Meso- and metathoracic wings well developed. Tegminae 5 times as long as pronotum, hyaline ochre in colour.

**Abdomen.** Missing.

**Female. Head.** 0.97 times as wide as pronotum, eyes similar to male (Fig. 13c); vertex arcuated lower than imaginary line joining apex of eyes; ocelli small, frontal shield transverse, upper margin more or less rounded.

**Thorax.** Pronotum short (Fig. 13c), 1.75 times as long as its maximum width and 2.8 times as long as its minimum width; lateral margins moderately denticulated; supracoxal dilation rounded and well developed; metazone with arcuated lateral margins 1.33 times as long as prozone. Anterior legs more robust than the male: coxae 0.83 times as long as pronotum, and 3.53 times as wide as its maximum width, external margins spinulated. Femurs 1.09 times as long as pronotum (Fig. 2o). Middle and hind legs slender with short hairs. Meso- and metathoracic wings not extending beyond the distal margin of the 1<sup>st</sup> urotergite.

**Abdomen.** Cylindrical, urotergites with a median apical tooth; supranal lamina transverse with rounded distal margin.

**REMARKS.** This species was known by the original description (a male from Egypt), thus the finding of two more examples, a male and a female attributable to the same taxon, allowed us to better define this species.

**DISTRIBUTION.** Known only from Egypt (Fig. 21).

#### **8. *Ameles syriensis* Giglio-Tos, 1915.**

*Ameles syriensis* Giglio-tos, 1915: 150 (orig. descrip.)

**MATERIAL EXAMINED: JORDAN:** Wadi Shu'ayb As Salt 23.VI.05, 1 ♂ (leg. Omar); Assarw As Salt 10.06.05, 1 ♀ (leg. Omar).

**DIAGNOSIS.** Similar to *A. eldreichi* but with eyes less conical with an apical tubercle. Small in size, male 23mm and female 22 mm, ochre in colour. Pronotum slender (ratio PL/SDW >2).

#### **DESCRIPTION**

**Male. Head.** 0.79 times as wide as pronotal supracoxal dilation. Eyes ovoid with a small apical tubercle; vertex straight, lower than imaginary line joining apex of eyes (Fig. 14a); frontal shield transverse, upper margin subrounded, disc with two longitudinal carina.

**Thorax.** Pronotum 2.06 times as long as its maximum width and 2.9 times as long as its minimum width (Fig. 14a); pronotal supracoxal dilation largely rounded extending beyond half metazone; lateral margins smooth; metazone without median longitudinal carina. Anterior legs slender: coxae 0.84 times as long as pronotum, prismatic with triangular section; femora 1.06 times as long as pronotum and about 3.91 times as long as their maximum width (Fig. 2d). Tibiae with 8-9 internal and 10 external ochre spines. Middle and hind legs slender with numerous hairs; posterior metatarsi shorter of the 2<sup>nd</sup> tarsal segment. Meso- and metathoracic wings well developed. Tegminae hyaline 5 times as long as pronotum with subrounded apex, costal field hyaline.

**Abdomen.** Cylindrical. Supranal plate triangular with subrounded apex. Cerci extending beyond apex of subgenital

plate, with 8-9 cylindrical segments except the last conical one.

**External male genitalia.** Ventral phallomere rhomboidal about 1.71 times as long as its width; distal process short with two small apical teeth (Fig. 14e). Left phallomere well sclerotized (Fig. 14c,d): dorsal lamina wide without spines; phalloid apophysis with anterior branch with a well sclerotized process on anterior right side, posterior branch membranous.

**Female.** *Head.* 0.78 times as wide as pronotum. Eyes similar to male (Fig. 14b); vertex arcuated, higher than imaginary line joining apex of eyes; ocelli small, frontal shield transverse, upper margin acute.

*Thorax.* Pronotum (Fig. 14b) 2.07 times as long as its maximum width and 3.29 times as long as its minimum width; lateral margins moderately denticulated; pronotal supracoxal dilation similar to male. Anterior legs more robust than male: coxae 0.80 times as long as pronotum, margins spinulated. Femora similar to male, as long as pronotum (Fig. 2p). Middle and hind legs slender with short hairs. Meso- and metathoracic wings not extending beyond the distal margin of 1<sup>st</sup> urotergite.

*Abdomen.* Cylindrical, supranal lamina similar to male.

**DISTRIBUTION.** Known from Jordan and Syria (Fig. 21).

#### 9. *Ameles dumonti* Chopard, 1943.

*Ameles dumonti* Chopard, 1943 (orig. descr.)

**MATERIAL EXAMINED:** TUNISIA : Gafsa Aweiss, 1904 1 ♂ (MNHN); Maknassy XI-1904, 2 ♂ (leg. Dumont) (MNHN).

**DIAGNOSIS.** Small in size, males from 22 to 24 mm, ochre in colour; similar to *A. decolor*, but with more globular eyes. Pronotum slender (ratio ratio PL/SDW >2). Tegminae with small brown spots on the primary veins.

#### DESCRIPTION.

**Male.** *Head.* 0.80 times as wide as pronotal supracoxal dilation. Eyes globular with a small apical tubercle (Fig. 15a); vertex straight, moderately lower than imaginary line joining apex of eyes with sparse small black spots; frontal shield transverse, upper margin rounded.

*Thorax.* Pronotum (Fig. 15a) short 1.94 times as long as its maximum width and 3.36 times as long as its minimum width; lateral margins smooth; pronotal supracoxal dilation not well developed; metazone 1.64 times as long as prozona. Anterior legs slender: coxae 0.94 times as long as the length of pronotum, prismatic with triangular section; femora 1.08 times as long as pronotum and 4 times as long as their maximum width (Fig. 2g). Tibiae 0.72 times as long as the length of pronotum with 9 internal and external spines. Middle and hind legs slender with short hairs. Meso- and metathoracic wings well developed. Tegminae 5.6 times as long as pronotum, hyaline with sub-rounded apex extending beyond the subgenital plate.

*Abdomen.* Cylindrical. Supranal plate triangular with rounded apex. Cerci with 9 segments longer than wide except the last conical one.

**External male genitalia.** Ventral phallomere rhomboidal 2.41 times as long as its width; distal process short with two apical teeth of which the dorsal one is larger (Fig. 15b). Left phallomere well sclerotized (Fig. 15c,d): dorsal lamina wide; ventral lamina narrow with membranous lobe with long and

dense hairs; phalloid apophysis with anterior branch with a well sclerotized process on anterior right side, posterior branch membranous.

**DISTRIBUTION.** This species is known from Tunisia (Fig. 21).

#### 10. *Ameles fasciipennis* Kaltenbach, 1963 .

*Ameles fasciipennis* Kaltenbach, 1963 (orig. descr.)

**MATERIAL EXAMINED:** HOLOTYPE, male, Tolentino, Marche (ITALY), 1 ♂ (NHMW).

**REMARKS.** This species has been described in detail by Kaltenbach (1963) and will not be further discussed here. It is similar to *A. spallanzania* from which it differs in the shape of the copulatory apparatus.

**DISTRIBUTION:** This species is known only from Tolentino (Italy) (Fig. 19).

#### 11. *Ameles poggii* Lombardo, 1986.

*Ameles poggii* Lombardo, 1986 (orig. descr.).

*Ameles decolor*, Werner 1908.

**MATERIAL EXAMINED:** Libya: Tripolitana, Giado VII.1938, 1 ♂ holotypus (leg. Krugen) (MSNG).

**REMARKS.** This species has been described in detail by Lombardo (1986) and will not be further discussed here. It differs from other species of *Ameles* by the distinctive shape of its copulatory apparatus.

**DISTRIBUTION.** This species is known from Libya (Fig. 19).

#### 12. *Ameles paradecolor* n.sp.

**MATERIAL EXAMINED:** HOLOTYPE, male: Sierra de Cazorla, W. of Nava del Espino, 600 m (SPAIN) 28-31.08.1963 (leg. P.M. Newman & A. Bown) (NMHL). Other material: 1 female same locality of the male.

**DIAGNOSIS.** Small in size, male 26mm and female 24 mm, ochre in colour. Small in size, green in colour; eyes rounded without a small apical tubercle; frontal shield transverse. Pronotum slender (ratio PL/SDW >2). Male tegminae superating the apex of subgenital plate, costal area with a narrow white longitudinal marginal strip. Female with the wings reaching distal margin of the 1<sup>st</sup> urotergite. Abdomen cylindrical.

#### DESCRIPTION.

**Male.** *Head.* 1.71 times as wide as pronotal supracoxal dilation. Eyes rounded without apical spine (Fig. 18a); vertex straight, lower than imaginary line joining apex of eyes; frontal shield transverse, upper margin acute; disc with two longitudinal carinae.

*Thorax.* Pronotum (Fig. 18a) 2.23 times as long as its maximum width and 3.35 times as long as its minimum width; lateral margins smooth with sparse short hairs; pronotal supracoxal dilation rounded. Anterior legs slender: coxae 0.74 times as long as pronotum, prismatic with triangular section; internal surface with small sparse brown granules; distal lobes divergent. Femora about as long as pronotum and about 4.18 times as long as their maximum width (Fig. 2f). Tibiae with 9 internal and external ochre spines. Middle and hind legs slender with dense short hairs. Meso-

and metathoracic wings well developed. Tegminae 2.38 times as long as pronotum, hyaline with a narrow white strip on external anterior margin.

**Abdomen.** Cylindrical, urosternites longer than wide. Supranal lamina transverse with rounded distal margin; cerci with 8 short cylindrical segments except the last conical one.

**External male genitalia.** Ventral phallomere (Fig. 18c) rhomboidal 1.8 times longer than its width; distal process bidentate with gibbosus posterior margin (Fig. 18c). Left phallomere well sclerotized (Fig. 18d,e); dorsal lamina large with numerous short spines; phalloid apophysis (Fig. 18e) sinuous with a robust process on anterior right side and with membranous distal branch.

**Female. Head.** 0.77 times as wide as pronotal supracoxal dilation. Eyes similar to male (Fig. 18b); vertex arcuated, higher than imaginary line joining apex of eyes; ocelli small, frontal shield transverse, upper margin rounded.

**Thorax.** Pronotum (Fig. 18b) 2 times as long as its maximum width and 3.05 times as long as its minimum width; lateral margins smooth; pronotal supracoxal dilation rounded. Anterior legs more robust than the male: coxae smooth. Femora about 0.81 times as long as pronotum (Fig. 2r). Middle and hind legs slender with short hairs. Meso- and metathoracic wings not extending beyond the distal margin of the 1<sup>st</sup> urotergite.

**Abdomen,** elongated and narrow. Supranal lamina transverse with rounded distal margin. Cerci with 9 short cylindrical segments except the last conical one.

**REMARKS.** This species is near to *A. decolor* from which it differs in the shape of the eyes, which are comparatively more rounded and in the more elongated phalloid apophysis. Considering the close resemblance between *A. paradecolor* and *A. decolor*, we believed that specimens from Spain previously attributed to *A. decolor*, must be instead referable to this new species.

**DISTRIBUTION.** This species is known from Spain (Fig. 21).

### 13. *Ameles insularis* n.sp.

**MATERIAL EXAMINED:** HOLOTYPE, male, Mallorca Island, Los Maravillas (SPAIN) 10.1983 (leg. Ehrmann) (MNHN).

**DIAGNOSIS.** Similar to *A. paradecolor*, but with more globular eyes and more slender anterior femurs. Small in size, male 25 mm, green in colour. Pronotum very slender (ratio PL/SDW >2). Pronotal supracoxal dilation narrowly rounded; middle and posterior legs with short hairs. Tegminae superating the apex of subgenital plate. Abdomen cylindrical; cerci long.

#### **DESCRIPTION:**

**Male. Head.** 1.73 times as wide as pronotal supracoxal dilation. Eyes rounded without an apical tubercle (Fig. 17a); vertex straight, lower than imaginary line joining apex of eyes; frontal shield transverse, upper margin acute, disc with two longitudinal carinae.

**Thorax.** Pronotum slender (Fig. 17a), 2.36 times as long as its maximum width and 3.46 times as long as its minimum width; lateral margins smooth; pronotal supracoxal dilation with rounded lateral margins. Anterior legs very slender:

coxae 0.82 times as long as pronotum, prismatic with triangular section; femora 1.06 times as long as pronotum and about 4.8 times as long as their maximum width (Fig. 2m); internal surface with a small black spot at the base of femur. Tibiae with 11 internal and 10 external ochre spines. Middle and hind legs slender with short hairs. Meso- and metathoracic wings well developed. Tegminae 4.2 times as long as pronotum, hyaline with sub-rounded apex; costal field with a narrow white strip.

**Abdomen.** Cylindrical. Supranal plate triangular, transverse with acute apex. Cerci going beyond the apex of subgenital lamina with 12 cylindrical segments except the last flattened one.

**External male genitalia.** Ventral phallomere rhomboidal 1.78 times as long as its width; distal process short with two teeth separated by a wide incision (Fig. 17b). Left phallomere well sclerotized (Fig. 17c,d); dorsal lamina wide with numerous short spines; phalloid apophysis well developed: anterior branch with a no well developed process on anterior right side; posterior branch membranous with a small dorsal spine.

**REMARKS.** This species is related to *A. assoi* from which it can be distinguished by having a globular eye without ocular spine, a more slender anterior femur and a different development of the external male genitalia.

**DISTRIBUTION.** Known only from Mallorca Island (Fig. 20).

### 14. *Ameles* sp. (*prope spallanzania*)

**MATERIAL EXAMINED:** MOROCCO, Tanger 20-04-77, 1 ♂ (leg. Motta) (MDBU).

This specimen is related to *A. spallanzania* from which it can be distinguished by having a more globular eye without ocular spine, anterior femora more robust. Unfortunately the presence of only one specimen and the fact that *A. spallanzania* has a notable range of variability, did not permit us any further systematic evaluation. However we consider useful to provide a brief description of this male specimen.

**DIAGNOSIS.** Small in size, males 19 mm, ochre in colour. Pronotum robust (ratio PL/SDW <2). Anterior legs very robust.

#### **DESCRIPTION:**

**Male. Head.** 0.95 times as wide as pronotal supracoxal dilation with sparse black spots. Eyes globular without apical tubercle (Fig. 16a); vertex straight, moderately lower than imaginary line joining apex of eyes with sparse small black spots; frontal shield transverse, upper margin rounded.

**Thorax.** Pronotum (Fig. 16a) short 1.53 times as long as its maximum width and 2.78 times as long as its minimum width; lateral margins smooth; pronotal supracoxal dilation well developed; metazone 1.35 times as long as prozona. Anterior legs robust: coxae 0.82 times as long as the length of pronotum, prismatic with triangular section; femora 1.27 times as long as pronotum and 3.26 times as long as their maximum width (Fig. 2b). Tibiae 0.97 times as long as the length of pronotum with 9 internal and external spines. Middle and hind legs slender with dense long hairs. Meso- and metathoracic wings well developed. Tegminae 3.3 times as long as pronotum, hyaline with sub-rounded apex extending beyond the subgenital plate; costal field opaque with a white elongated strip.

*Abdomen.* Cylindrical. Supranal plate small, triangular with rounded apex. Cerci with 9 segments longer than wide except the last one that is conical.

*External male genitalia.* Ventral phallomere rhomboidal 1.73 times as long as its width; distal process short with two robust apical teeth of which the dorsal one is larger (Fig. 16b). Left phallomere well sclerotized (Fig. 16c,d.); dorsal lamina wide; ventral lamina narrow with membranous lobe with long and dense hairs; phalloid apophysis with the anterior branch with a well sclerotized process on anterior right side, posterior branch membranous.

**DISTRIBUTION.** This specimen is known from Morocco: Ifrane, Moyen Atlas, Ari Ayachi (Fig. 19).

### Biogeographic analysis.

The genus *Ameles* is a Palaeo-Mediterranean element that was widespread in the entire Mediterranean basin during the Tertiary Period and for which it is not possible to identify or delimitate a possible centre of origin. The analysis of the results obtained with the cladistic approach on the morphological data allows us to evaluate the degree of differentiation between the species and to be able to express some considerations as regards the biogeography of this genus. A first consideration regards the affinity between the species *A. picteti*, *A. assoi* and *A. insularis*; they probably derive from a single strain that originated during the Palaeocene period in the Alboran plate that owing to its break up differentiated into the current three species. The absence from the Italian peninsular of species belonging to this group speaks in favour of its origin being in Prepliocenic times.

Another interesting Palaeo-Tyrrhenian group of species is represented by *A. spallanzania*, *A. fasciipennis* and *A. poggii*. They probably derive from a single strain that originated during the Palaeocene Epoch in the Alboran plate (Tyrrhenis) and then, following the known palaeogeographic events, which took place in that geographic area, they differentiated into the current three species. In this group the position of *A. poggii* is still uncertain due to the poor information that is available for this species, known up to now for only one male specimen collected near Tripoli. *A. spallanzania*, well distributed in the Mediterranean basin, this is also to be considered as a Palaeo-Tyrrhenian species, which moved along the Apennine peninsular, prevalently in a West – East direction, colonised the Balkan peninsular and the Ionian Islands. This eastern extension of their area, without a doubt post-Pleistocenic, is supported by the finding of *A. fasciipennis*, “sister-species” of *A. spallanzania*, in the Tolentino (Marche).

The last group of species is *A. decolor*, *A. heldreichi* and *A. dumonti*, *A. aegyptiaca*, *A. syriensis* that make up a group whose origin is probably Palaeoaegean. *A. decolor* on the one hand moved towards the West, probably in the Plio-

cene Epoch, moving around the Adriatic and reaching Provence and thus into Spain, while on the other hand it reached Sicily in the Miocene Epoch during the marine regression of the Pontic times; while *A. heldreichi* invaded all the Balkan peninsula, pushing down south along the African coasts to Tunisia where it diversified into the species *A. dumonti*, *A. aegyptiaca* and *A. syriensis*.

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## Appendix Characters

### Head

1. Eyes: conical with apical acuminate spine (0); ovoid with apical small spine (1); rounded without spine (2).  
The evolutionary trend of the eye shape and the presence or absence of an ocular spine is ontogenetically fixed; That is, species with rounded eyes and without an ocular spine in the adult stage, always have the larval stage with ovoid eyes and an apical spine. (Kaltenbach 1963 and personal observation of Lombardo).
2. Ocelli of the males: large (0); small (1).
3. Frontal shield : ratio width/height < 2 (subquarrish) (0); ratio width/height comprises between 2, 1-2,9 (transverse) (1); ratio width/height > 2 (very transverse) (2).  
The common shape in the Amelinii from Aethiopian region is squarish that represent a plesiomorphic state.

### Pronotum

4. Pronotum robust, rounded supracoxal dilation (0); Pronotum less robust, ovoid supracoxal dilation (1); Pronotum slender, elliptical supracoxal dilation (2).  
This evolutionary trend is confirmed owing to that in the majority numerous of the Amelinii of the Aethiopian region, the pronotum is robust with a rounded supracoxal dilation.

### Anterior coxae

5. Anterior margin with 3-5 small spines (0); anterior margin without spines (1).  
The presence of spines on the coxae is normally within of the Amelinii therefore yours exemplification represent an apomorphic state.
6. Distal internal lobes: unequal in size (0); distal internal lobes equal in size (1).

### Anterior femora

7. Robust ratio length/width between <3.4 (0); less robust ratio length/width between 3.5-4 (1); slender ratio length/width >4 (2).  
This evolutionary trend is confirmed owing to that in the majority numerous of the Amelinii of the Aethiopian region, the femora are robust.

### Middle and posterior legs

8. With a well developed hairy (0); Not well developed hairy (1).  
The presence of long hairs is common within the genus *Ameles*: therefore yours exemplification represent an apomorphic state.
9. Posterior metatarsus longer than the 2<sup>nd</sup> segment (0); as long as the 2<sup>nd</sup> segment (1); shorter than the 2<sup>nd</sup> segment (2).  
The evolutionary tendency to posterior metatarsus shortening is present in all Amelinii of the Palearctic region. (Uvarov 1940).

### Wings

10. Going beyond the apex of abdomen (0); Not reaching the apex of abdomen (1).  
The evolutionary trend to mesothoracic wings shortening is present in all Amelinii of the Palearctic region (Kaltenbach 1963).
11. Costal field of mesothoracic wings: without a white longitudinal stripe (0); with white longitudinal stripe (1).  
The near genus of the Aethiopian region have normally the mesothoracic wings with a longitudinal white stripe therefore your lack represent an apomorphic state.
12. Longitudinal veins of mesothoracic wing: uniformly ochraceous (0); alternatively with ochraceous and blackish lines (1).  
The Amelinii of the Aethiopian region (comprises the outgroup) have the longitudinal veins of the mesothoracic wings uniformly coloured. The presence of blackish lines represent an apomorphic state.

### Abdomen of the females

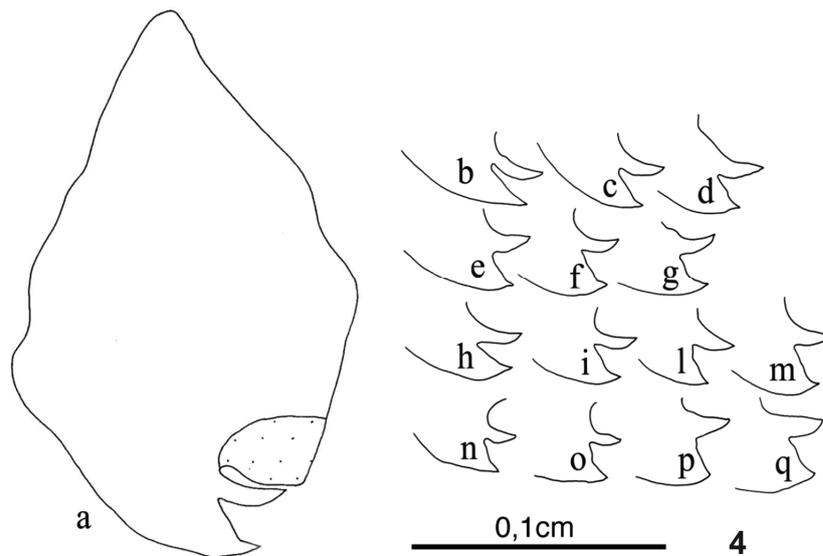
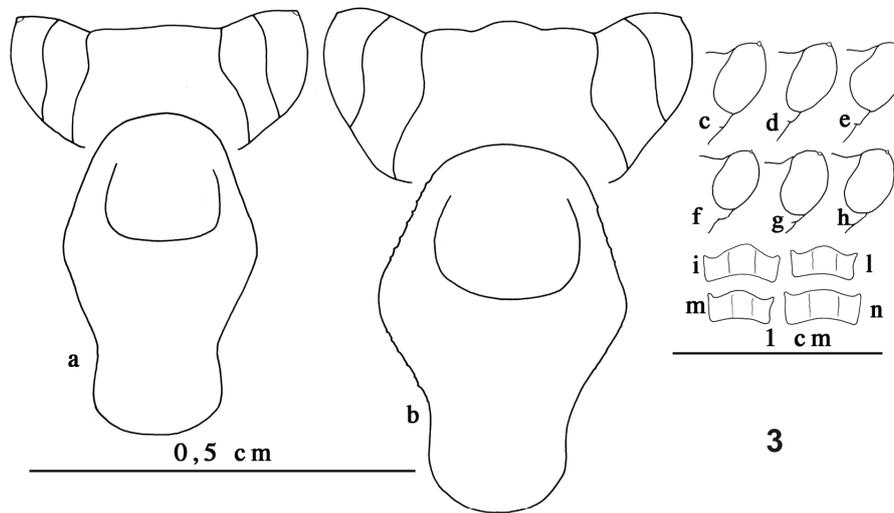
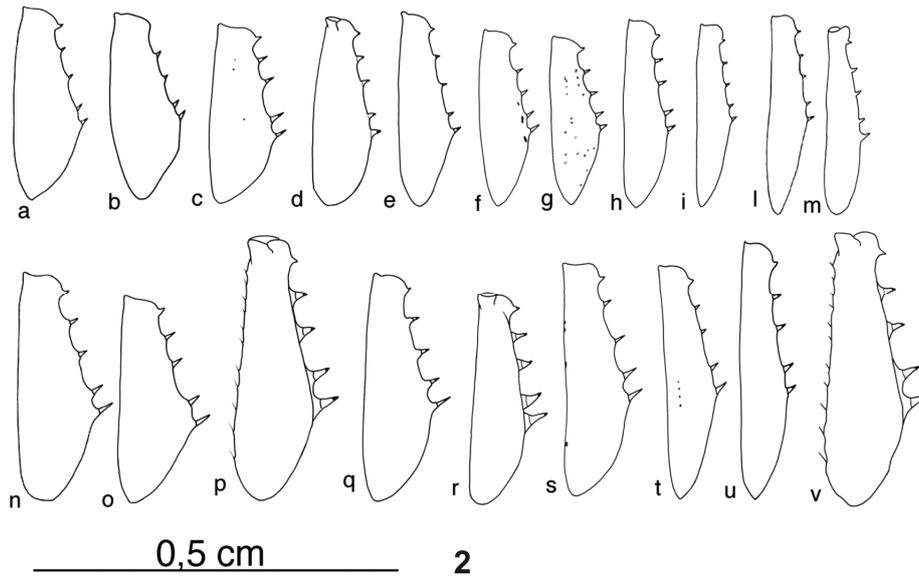
13. Rhomboid (0); cylindrical (1).  
It is rhomboid in the outgroup and in all Amelinii from Aethiopian region.
14. Distal margin of the tergites: smooth (0); with a small raised median tooth (1).

### Abdomen of the males

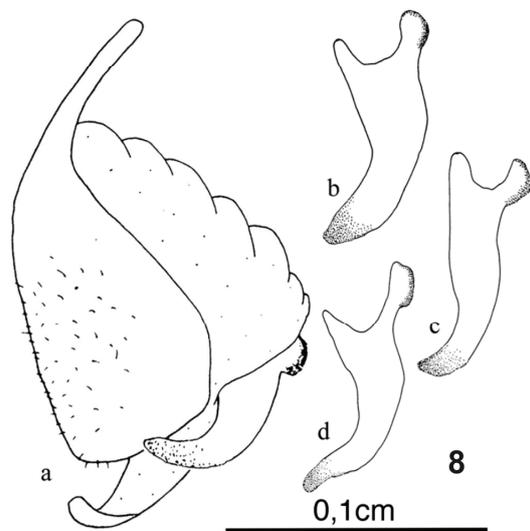
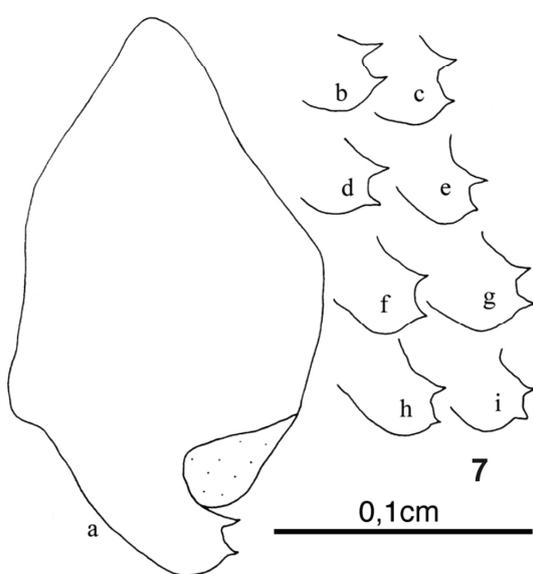
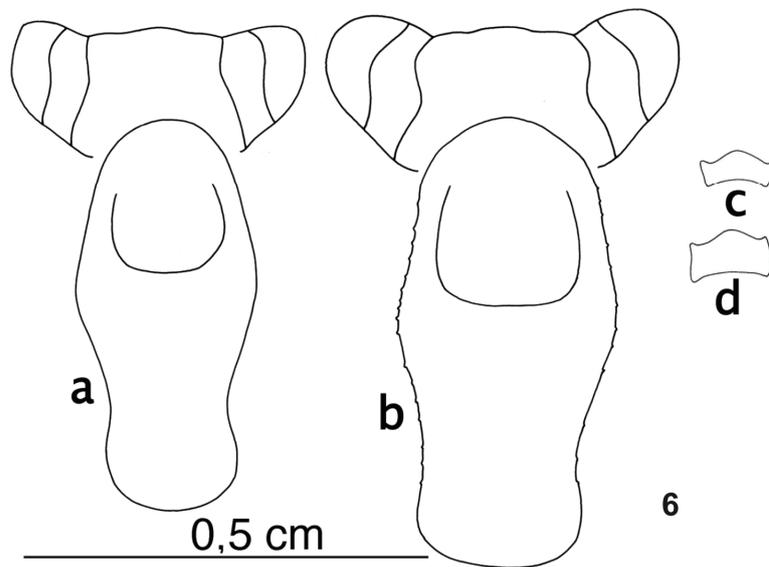
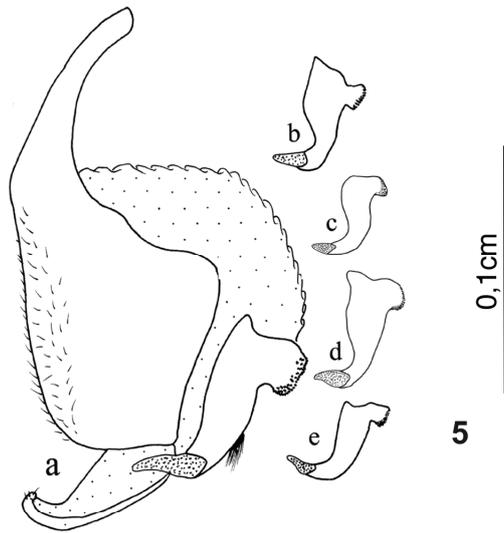
15. Apical margin of supranal plate: rounded (0); sub-acute (1); acute (2).  
The evolutionary trend of the supranal plate within Amelinii is from rounded (very common) to sub-acute and acute (more rare).
16. Subgenital plate longer than wide (0); as long as wide (1).
17. Apex of subgenital plate: incised (0); not incised (1).
18. Last segment of cerci: cylindrical (0); flattened (1).  
Within of the Amelinii, the segments of the cerci are cylindrical normally (plesiomorphic character), only in rare case they are flattened (character apomorphic).
19. Cerci going beyond the apex of subgenital plate (0); cerci reaching the apex of subgenital plate (1).

### Male external genitalia.

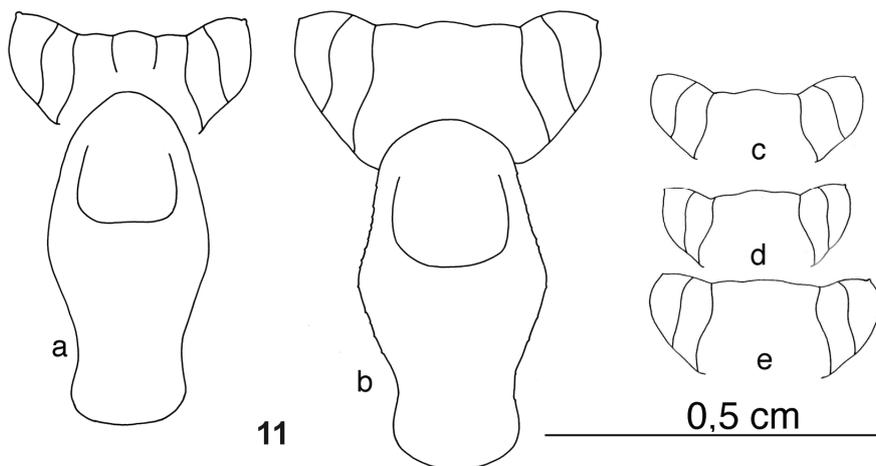
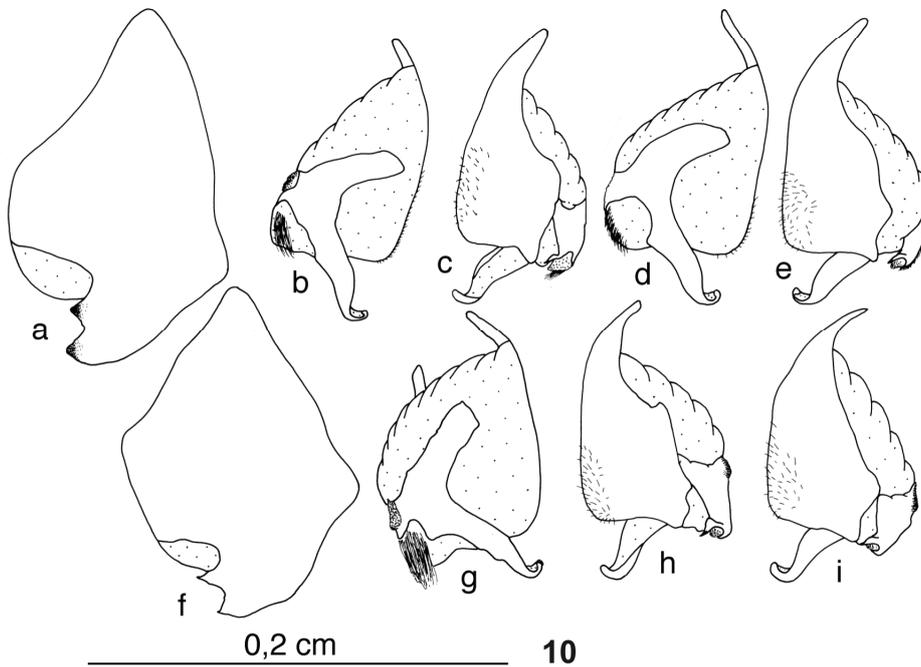
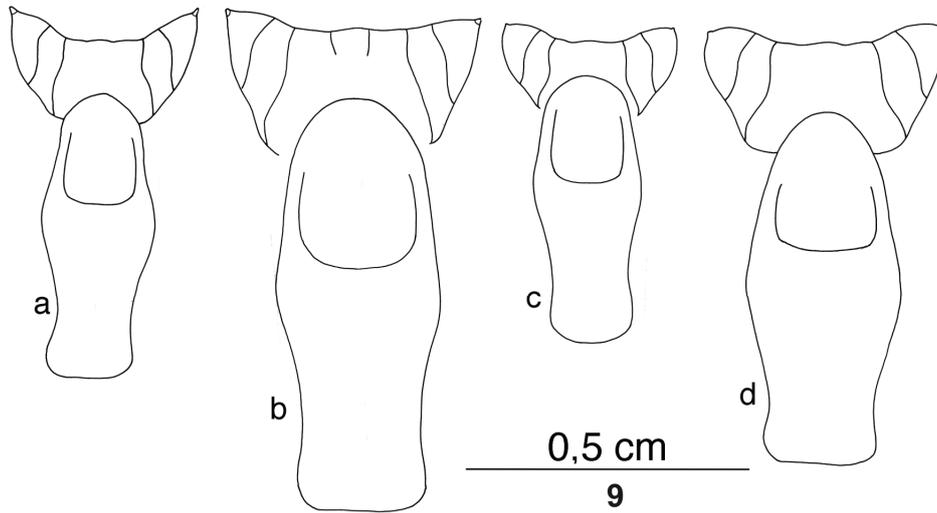
20. Ventral phallomere with: distal process of simple (no forked) (0); with two teeth separated by a incisure (1).  
*Ameles* within of the Palearctic genus *Pseudoyersinia* and *Apteromantis* is the only one that present one group of the species with the distal process equal teeth separated by a narrow incisure. Therefore this character is an apomorphie.
21. Left phallomere with: apophysis phalloide with a distal spine (0); apophysis phalloide without spine (1).



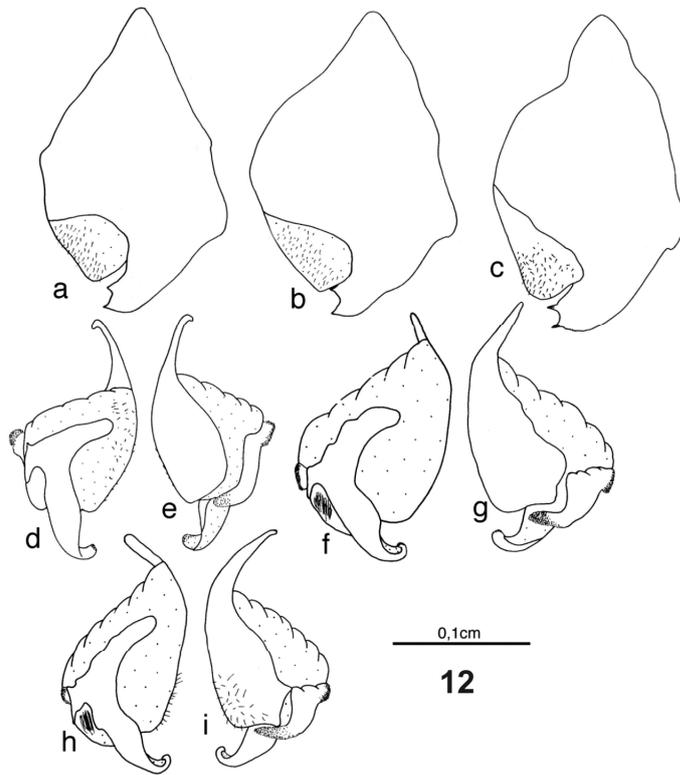
**Fig. 2.** Anterior femurs of: *A. spallanzania* (a ♂, n ♀); *A. sp. (prope spallanzania)* (b ♂); *A. aegyptiaca* (c ♂, o ♀); *A. syriensis* (d ♂, p ♀); *A. decolor* (e ♂, q ♀); *A. pardecolor* ( f ♂, r ♀); *A. dumonti* (g ♂); *A. heldreichi* (h ♂; s ♀); *A. assoi* (i ♂, t ♀); *A. picteti* (l ♂, u ♀); *A. insularis* (m ♂); *A. kervillei* (v ♀). **Fig. 3.** *A. spallanzania*: a (♂), b (♀), head and pronotum; c-h, male eyes; i-n, male frontal shield. **Fig. 4.** *A. spallanzania* : a, ventral phallomere in dorsal view; b-q, distal process apex.



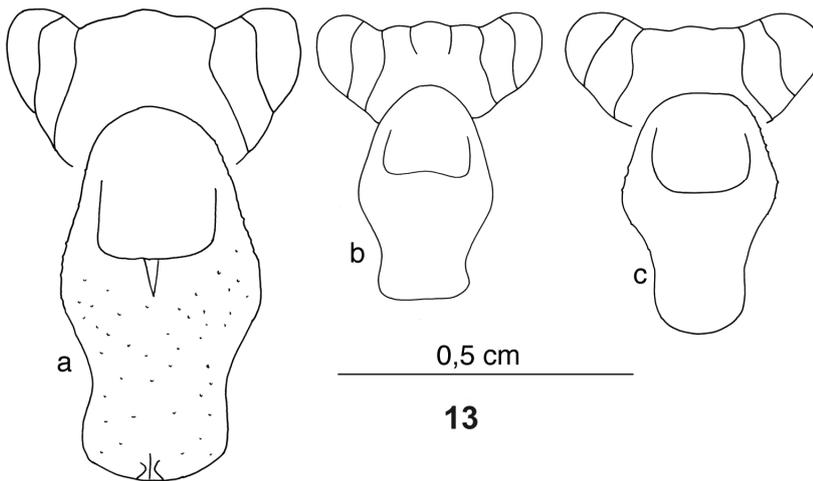
**Fig. 5.** *A. spallanzania*: a, left phallomere in dorsal view; b-e, phalloid apophysis. **Fig. 6.** *A. decolor*: a (♂), b (♀), head and pronotum; c (♂), d (♀), frontal shield. **Fig. 7.** *A. decolor*: a, ventral phallomere in dorsal view; b-i, distal process apex. **Fig. 8.** *A. decolor*: a, left phallomere in dorsal view; b-d, phalloid apophysis.



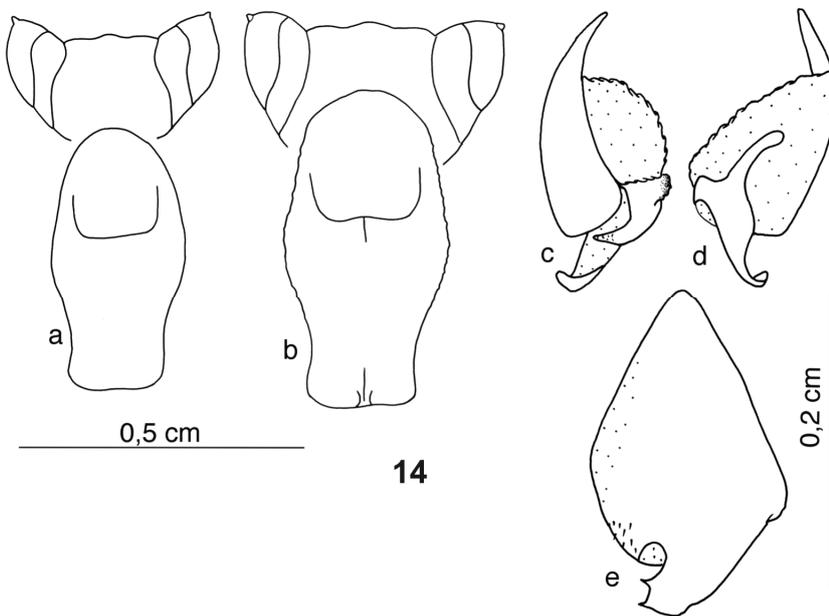
**Fig. 9.** Head and pronotum of: *A. picteti*, a (♂), b (♀); *A. assoi*, c (♂), d (♀). **Fig. 10.** Male external genitalia of: *A. picteti*, a, ventral phallomere; b-d, left phallomere. *A. assoi*, f, ventral phallomere; g-i, left phallomere. **Fig. 11.** *A. heldreichi*: a (♂), b (♀) head and pronotum from Greece; c, head from Cyprus (holotype); d-e, head from Palestine.



**Fig. 12.** Ventral and left phallomere of *A. heldreichi*: a,d,e, from Greece; b,f,g from Cyprus (holotype); c,h,i from Palestine.

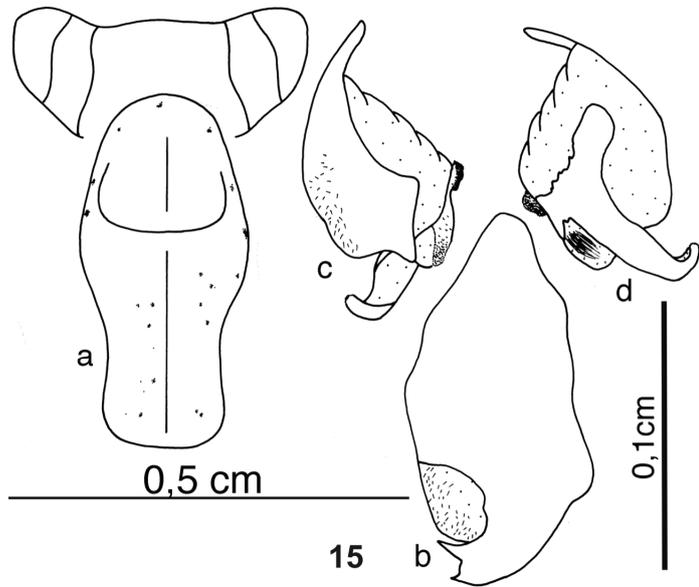


**Fig. 13.** Head and pronotum of: a (♀), *A. kervillei*; b (♂), c (♀), *A. aegyptiaca*.

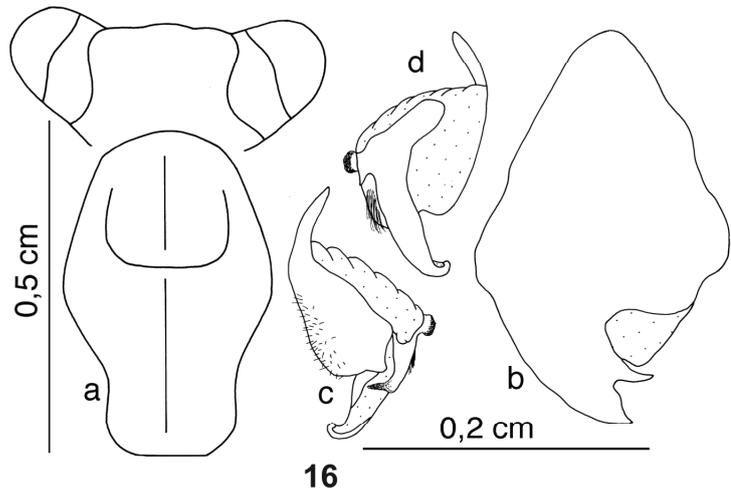


**Fig. 14.** *A. syriensis*: a (♂), b (♀), head and pronotum; e, ventral phallomere; c-d, left phallomere.

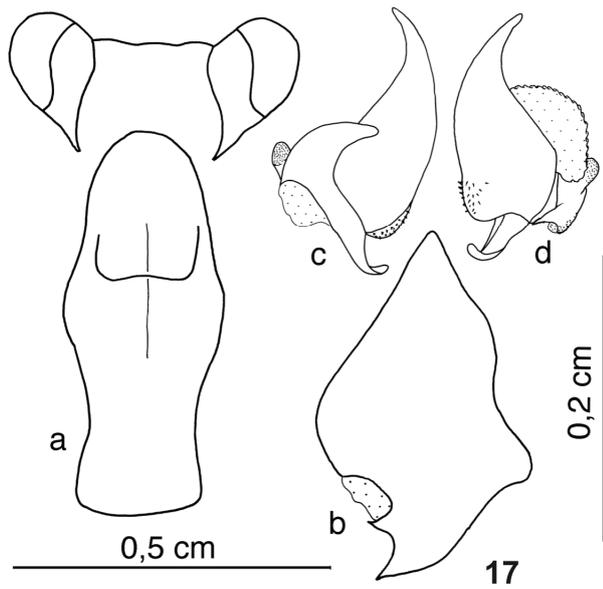
**Fig. 15.** *A. dumonti*: a (♂), head and pronotum; b, ventral phallomere; c-d, left phallomere.



**Fig. 16.** *A. sp.(prope spallanzania)*: a (♂), head and pronotum; b, ventral phallomere; c-d, left phallomere.



**Fig. 17.** *A. insularis*: a (♂), head and pronotum; b, ventral phallomere; c-d, left phallomere.



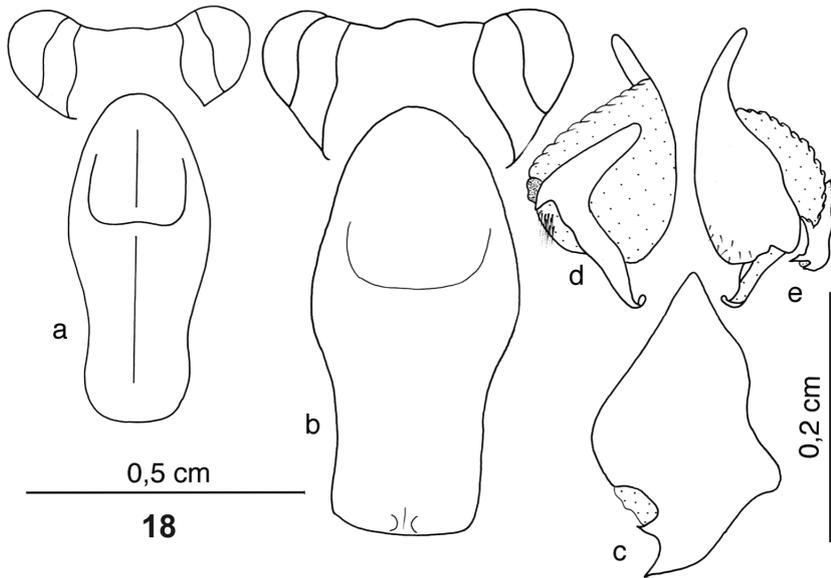


Fig. 18. *A. pardecolor*: a (♂), b (♀), head and pronotum; c, ventral phallomere; d-e, left phallomere.

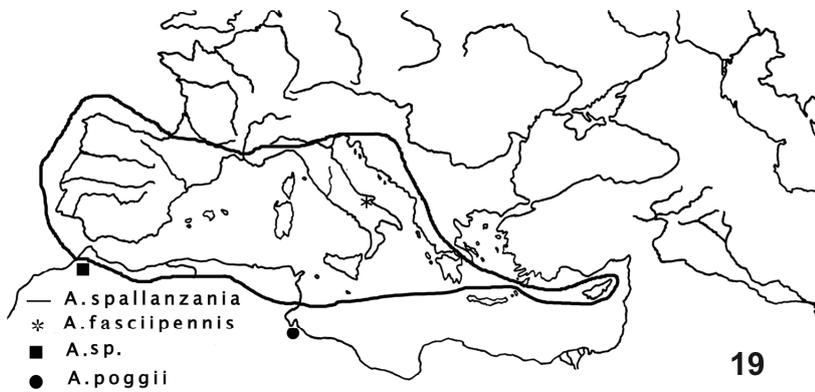


Fig. 19. Geographic distribution of "fasciipennis group".

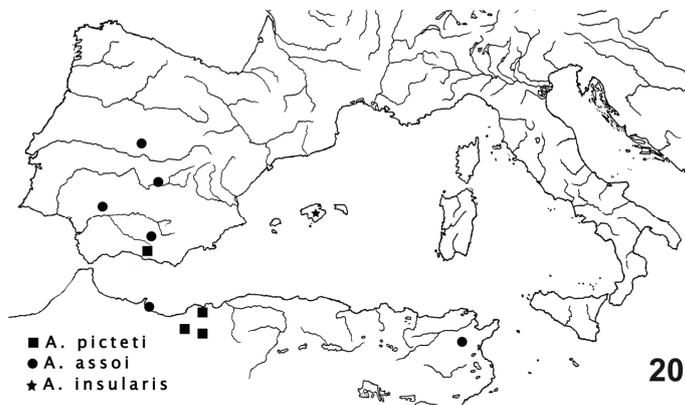


Fig. 20. Geographic distribution of "picteti" group".

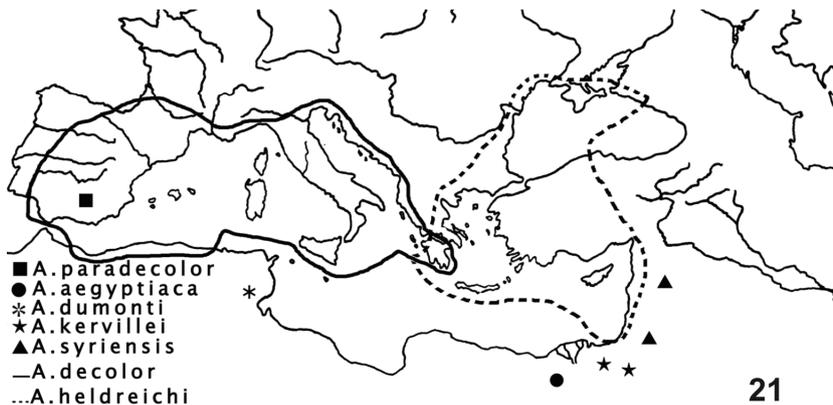


Fig. 21. Geographic distribution of "decolor group".