

## ***Myrmeleon mariaemathildae* n. sp.: a new Mediterranean pit-building antlion (Neuropterida Myrmeleontidae)**

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### **Abstract**

A new Mediterranean species of antlion, *Myrmeleon mariaemathildae* n. sp., is described on material from Sardinia (Italy) and Tunisia. The new species, small in size with a relatively pale habitus, can be distinguished from all the other known species of *Myrmeleon* in the West Palearctic area on the basis of a set of chromatic characteristics, external morphological features, and the morphology of the internal male genitalia. The characteristics which differentiate it from *Myrmeleon inconspicuus* Rambur 1842, the only other species with which it could be confused, are discussed in detail. A preliminary description of the third instar larva is also provided. From a bio-ecological point of view, *M. mariaemathildae* n. sp. is associated with coastal dune environments colonized almost exclusively by grassy vegetation in which the larvae often build their pits close to *Ammophila* plants. The new species, where present, shows a perfect differentiation of its coastal dune habitat with other species: *M. inconspicuus* and *Myrmeleon hyalinus* Olivier 1811 in Sardinia; these and others are being studied in Tunisia.

**Key words:** Neuroptera, new species, Sardinia, Italy, Tunisia.

### **Introduction**

The discovery of a new myrmeleontid in Europe is a rare but not exceptional event. Over the last sixty years seven new species have been described, five of which are probably valid. They are, in chronological order: *Myrmeleon noacki* Ohm 1965; *Aspoeckiana uralensis* Hölzel 1969; *Cueta beieri* Hölzel 1969; *Myrmeleon gerlindae* Hölzel 1974; *Neuroleon aegaeus* Willmann 1977, whose validity is uncertain (Aspöck *et al.*, 2001); *Megistopus mirabilis* Hölzel 1981, probably a synonym for *Neuroleon lucasi* (Navás 1912) (Güsten, 2003); *Tricholeon relictus* Hölzel et Monserrat 2002. All of these, however, are either to be found at the extreme eastern margins of Europe (*A. uralensis*, *C. beieri*, *N. aegaeus*) or are particularly rare (*M. mirabilis*, *T. relictus*), or live in Mediterranean maquis environments which are difficult to explore (*M. noacki*, *M. gerlindae*). The finding of a new species which is very abundant in its larval state on the dunes of some of the most crowded tourist resorts in Sardinia (Italy) and Tunisia has therefore come as a great surprise.

The first specimens were examined about fifteen years ago when one of us (RAP), while rearing some larvae of a pit-building antlion collected on the dunes of North Sardinia, obtained a particularly pale adult which did not correspond in several details to the species he believed he had collected, *Myrmeleon inconspicuus* Rambur 1842. The examination of copious material together with many field observations, especially on differences in habitat, led us to believe we were dealing with a new species which will be described in this paper.

### **Materials and methods**

Apart from a very few exceptions, the adults examined come from larvae collected in the field. These were reared in an unconditioned room in small cylindrical containers a third full of loose sand. The preys were live yellow mealworm larvae, *Tenebrio molitor* L. (Coleoptera Tenebrionidae), of an adequate size.

A Leica MZ16 stereomicroscope was used both for morphological measurements by means of an ocular micrometer, and for photographs taken using a Leica DFC320 digital camera and LAS (Leica Application Suite) applied software Version 2.5.0 R1. Preliminary observations of the larva were made with a SEM Philips XL30 ESEM scanning electron microscope.

The length of the adult was measured from the vertex of the head to the tip of the abdomen. The length of the wings was measured from the base to the apex, and the width was taken as the maximum width perpendicular to the length measurement line.

The preparations of male and female genitalia were made by maceration in 10% potassium hydroxide in cold water for some hours.

The terminology concerning the digging-setae of the IX sternite of the larvae is that used by Steffan (1975) and Nicoli Aldini (2007).

The labels of each specimen have been faithfully transcribed (never using italics) separating the lines by a “\” and the further labels by a “\”.

When not otherwise specified, the specimens have been deposited in the Roberto A. Pantaleoni collection by ISE-CNR Sassari.

## *Myrmeleon mariaemathildae* n. sp.

### Derivatio nominis

The name of this species is an affectionate tribute to Maria Matilde Principi, Professor Emeritus at the University of Bologna, doyen of Neuropterologists worldwide, on the occasion of her 95<sup>th</sup> birthday. Professor Principi will forgive us if we use her Christian name, but with this familiarity we would like to bear witness to her love for these insects, which transpires from her unparalleled "Contributi allo studio dei Neurotteri italiani" [Contributions to the Study of Italian Neuroptera], a love which she has passed on to those who have followed her in this research, and for which we personally are indebted to her.

### Diagnosis

Small *Myrmeleon* with variegated but relatively pale habitus; pronotum with characteristic and discriminating pattern; legs with scanty dark pigmentation; wings with dark-and-pale dashed veins, in the forewing cubital fork situated in a more basal position than the fork of the Media posterior, male with *pilula axillaris*; abdomen with pale pleural membranes, abdominal tergites with pale dorso-proximal area with faded margins. Larva very pale, living in loose sand of sea dunes.

### Description of the adult

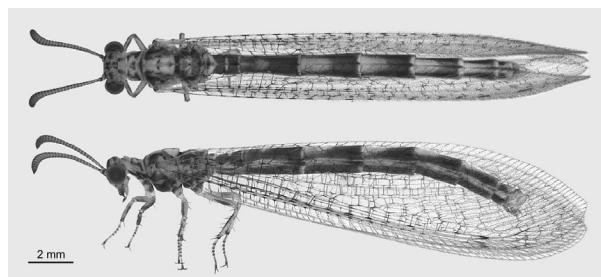
Body length 20.0 mm (min-max 18.0-22.0 mm); forewing male length 20.0 mm (18.1-22.5 mm), female length 21.6 mm (19.4-23.8 mm), ratio width/length (both sexes) 0.238 (0.218-0.254); hindwing male length 18.4 mm (16.5-21.0 mm), female length 20.1 mm (18.0-22.0 mm), ratio width/length (both sexes) 0.217 (0.200-0.236).

Basic colouring pale-dirty-yellowish variegated from pale brown to dark brown (figure 1).

Head: Vertex and occiput with spots as in figures 2 and 3; a brown mark surrounds the base of the antennae, extending upwards and connecting below with a sub-triangular frontal mark from which it is always separated by at least a paler, thin smudge; two rounded marks on the post-clypeus more or less connected to each other, but not to the frontal mark, as in figure 3B; antennae brown with proximal part of scape and of pedicel dark, flagellum composed of about thirty short segments; labrum pale; the last two segments of the maxillary palp and the last segment of the labial palp dark.

Thorax: Pronotum pale with a characteristic dark pattern varying in intensity and extension as in figure 3A; mesonotum and metanotum with a complex pattern, as in figure 2A, varying in intensity, however always with a pale longitudinal median stripe and especially two irregular longitudinal sub-lateral pale stripes which, starting from the pronotum and passing across the base of the wings, continue along the abdomen at the level of the pleural membranes.

Legs: Pale with pale brown stripes arranged as in figure 2A; base of the coxa and apex of the tibia dark brown. Spurs of all legs approximately as long as the first tarsomere.



**Figure 1.** *Myrmeleon mariaemathildae* n. sp.: habitus, dorsal (above) and lateral (below) view [Sardinia: Alghero, holotype ♂].

Wings: Shape and venation as in figure 2B; membrane hyaline, most of the veins (but not the Costa) with alternating brief pale and dark dashes especially evident on some of the longitudinal veins of the forewing (Subcosta, Radius and Cubitus anterior); in the forewing the cubital fork is slightly more basal than the fork of the Media posterior; hindwing with 4-5 presectoral cross-veins; male hindwing with *pilula axillaris*.

Abdomen: Shorter than the wings; tergites with more or less large pale dorso-proximal area with faded margins; sternites with pale distal notch with faded margins; pleural membranes almost totally pale (figure 2C). Male external terminalia as in figure 4A, gonarcus-paramere complex (complex of gonocoxites 9 + gonocoxites 11 *sensu* Aspöck and Aspöck, 2007) as in figure 5; female external terminalia as in figure 4B. Spermatheca simple with coiled duct.

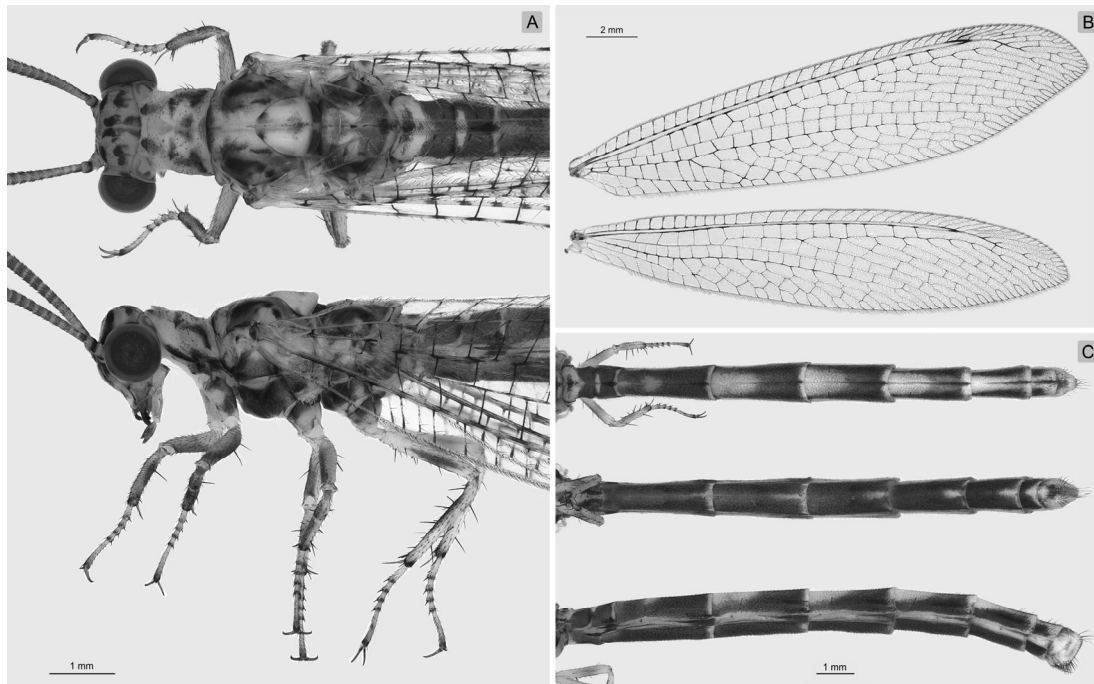
### Preliminary description of the 3<sup>rd</sup> instar larva

Larva straw-coloured with brown marks and dark-pigmented areas as in figure 6A; body covered with several dark setae; ventral side of the head with two symmetrical brown marks with undefined margins, which in the palest specimens fade almost to disappearing (figure 6A); strong and relatively long mandibles with three equidistant subparallel teeth; proximal tooth slightly shorter; labial palps 4-segmented; ocellar tubercles not laterally prominent. IX abdominal sternite with digging-setae arranged as follows: pair of simply developed palettes (*sensu* Steffan, 1975) each of which supports 1 large lateral macrochaeta and 3 medial large but short macrochaetae, the lateral macrochaeta variable in length, up to more than twice the length of the medial macrochaetae; intermediate group constantly composed of 4 short but large central macrochaetae often arranged in a disorderly manner and side by side with, or surrounded by, a very variable number of medium- and small-sized macrochaetae; often there is an arrangement in disorderly lines of 2 medium-sized external macrochaetae on each side, 4 short stout central macrochaetae and an extremely variable number (0-7) of small- or medium-sized randomly distributed macrochaetae; anterior group very variable with few (0-4) small- or medium-sized short macrochaetae arranged in a disorderly manner (figure 6B). All macrochaetae black.

### Variability

The variability in the pigmentation of the adult is quite wide in both extension and intensity of the dark areas on the body. In figure 3A the pronota of differently-pigmented specimens are shown. The variability in pigmentation is equally distributed among specimens from both Sardinia and Tunisia. The only real difference

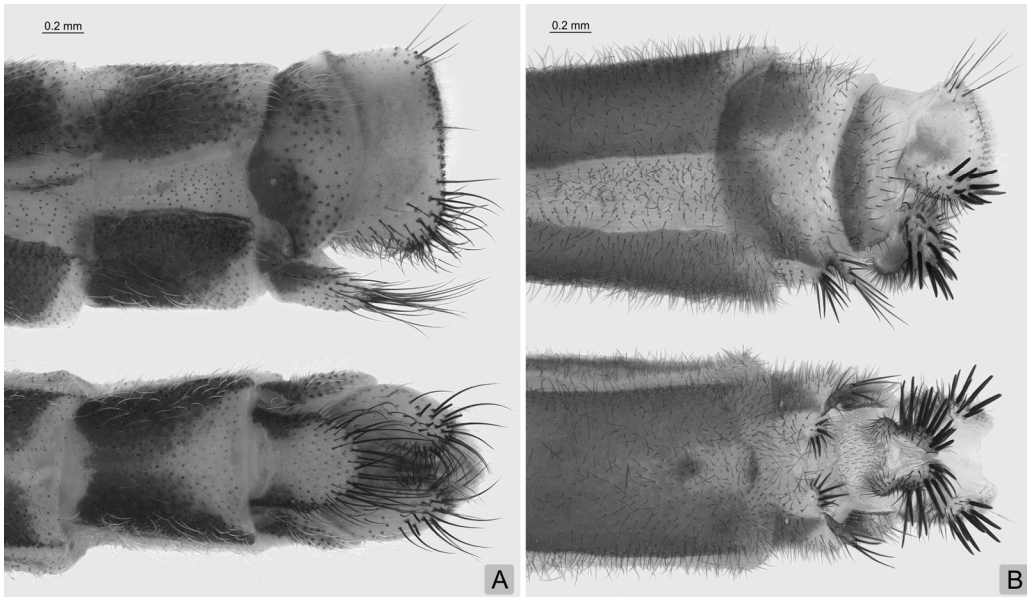
between the two populations, as far as it has been possible to ascertain, is the shape of the macrochaetae corresponding to the digging-setae of the IX sternite of the larva. In the Sardinian specimens, these take a shape similar to a spinning top with a round section, while in the Tunisian specimens they take the shape of a blunt tooth with a nearly quadrangular section (figure 6C).



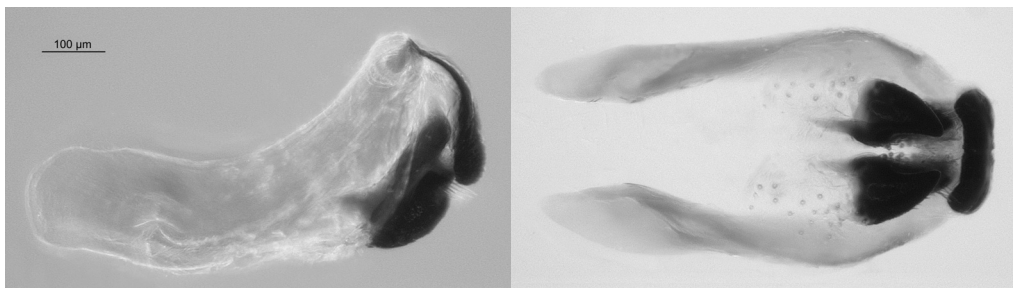
**Figure 2.** *Myrmeleon mariaemathildae* n. sp.: A, head and thorax, dorsal (above) and lateral (below) view [Sardinia: Alghero, holotype ♂]; B, wings [Sardinia: Alghero, paratype ♂]; C, abdomen, dorsal (above), ventral (middle) and lateral (below) view [Sardinia: Alghero, holotype ♂].



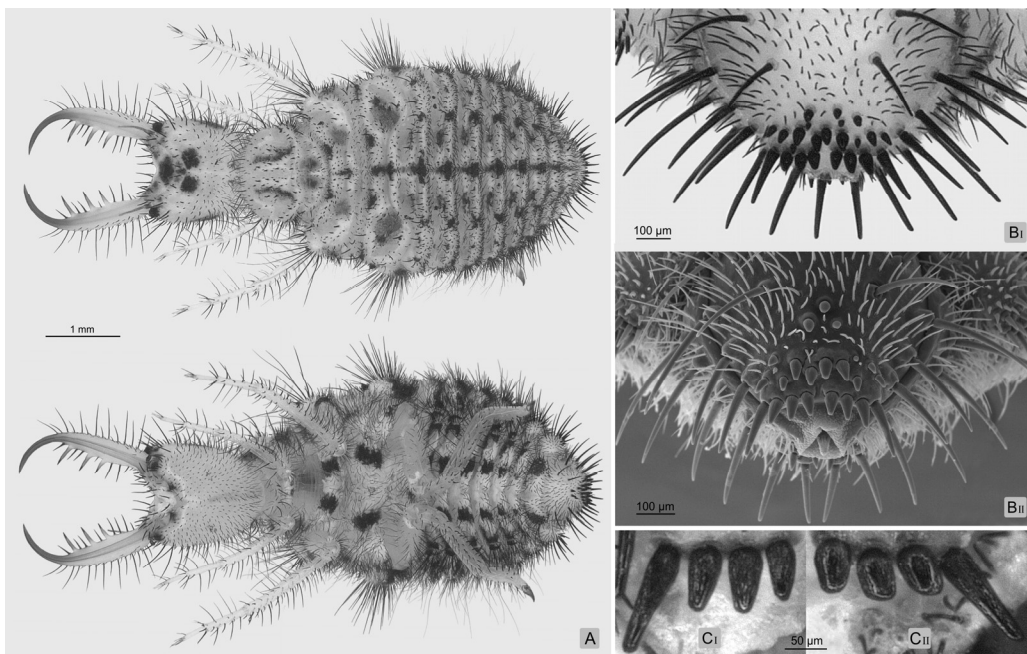
**Figure 3.** *Myrmeleon mariaemathildae* n. sp., variability in dark pigmentation: A, head and prothorax, dorsal view [left: Tunisia: Gammarth, ♀; middle: Sardinia: Alghero, paratype ♀; right: Tunisia: Zouaraa, ♀]; B, head, frontal view [left: Tunisia: Gammarth, ♀; right: Sardinia: Alghero, paratype ♂]. *Myrmeleon inconspicuus* Rambur: C, head and prothorax, dorsal view.



**Figure 4.** *Myrmeleon mariaemathildae* n. sp.: A, male terminalia, lateral (above) and ventral (below) view [Sardinia: Giba, paratype ♂]; B, female terminalia, lateral (above) and ventral (below) view [Sardinia: Sassari, paratype ♀].



**Figure 5.** *Myrmeleon mariaemathildae* n. sp.: gonarcus-paramere complex (complex of gonocoxites 9 + gonocoxites 11 *sensu* Aspöck and Aspöck, 2007), lateral (left) and ventral (right) view [Sardinia: Sassari, paratype ♂].



**Figure 6.** *Myrmeleon mariaemathildae* n. sp. 3<sup>rd</sup> instar larva: A, habitus, dorsal (above) and ventral (below) view; B, IX abdominal sternite, [I] optical and [II] SEM photo [Sardinia: Alghero]; C, macrochaetae of palette in IX abdominal sternite, [I] Sardinian [Alghero] and [II] Tunisian [Zouaraa] specimens.

## Holotype

♂ in alcohol

- “Alghero: Maria Pia (SS) \ ex larva 10.II.2008 \ C. Cesaroni legit \ mm1 \ 4051”  
[Collection of the Museo Civico di Storia Naturale “G. Doria”, Genoa]

## Paratypes

15 ♂♂ in alcohol

- “Aglientu: Rena Majore (SS) \ Santa Teresa di Gallura - ex larva 15.VII.2000 \ Pantaleoni legit \ 3758”
- “Stintino: La Pelosa (SS) \ ex larva 22.VI.2004 \ Pantaleoni legit \ 3073 \ 2.2”
- “Sassari: P.to Ferro (SS) \ ex larva 27.VII.2008 \ C. Cesaroni legit \ 4.15 \ 4058”
- “Sassari: P.to Ferro (SS) \ duna – ex larva 13.II.2000 \ Pantaleoni legit \ 3756”
- “Sassari: P.to Ferro (SS) \ duna – ex larva 27.VI.1997 \ Pantaleoni legit \ 3552”  
[Collection of the National Museum of Natural History, Sofia]
- “Sassari: P.to Ferro (SS) \ duna mare – ex larvae 22.IV.2000 \ Pantaleoni legit \ 3755”
- “Alghero: Maria Pia (SS) \ ex larva 13.IV.2008 \ C. Cesaroni legit \ mm2 \ 4050”
- “Alghero: Maria Pia (SS) \ duna spiaggia – ex larva 17.VI.2007 \ sf. 28.VIII.2007 \ C. Cesaroni legit \ 3979”
- “Alghero: Maria Pia (SS) \ ex larva 10.II.2008 \ C. Cesaroni legit \ mm4 \ 4052”  
[Collection of Victor Monserrat, Madrid]
- “Alghero: Maria Pia (SS) \ ex larva 10.II.2008 \ C. Cesaroni legit \ mm8 \ 4053”
- “Alghero: Lido (SS) \ duna – ex larva 30.III.2000 \ Pantaleoni legit \ 3742”  
[Collection of the Natural History Museum, Vienna]
- “Alghero: Lido (SS) \ ex larva VI.2002 – 3.8 \ Pantaleoni legit \ mm15 \ 4049”
- “I-Sardegna (Carbonia-Iglesias) \ Bugerru, Cala domestica, 10 m \ UTM-WGS84 32 S 0446540 4358436 \ 10.IX.2006, retino \ G.Nardi leg. \ Progetto Sardegna - CNBF \ Myrmeleon sp. \ R.Pantaleoni det. 2007”  
[Collection of the Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale “Bosco Fontana”, Verona]
- “Giba: Porto Botte – Is Solinas (CA) \ ginepreto 23.VIII.2005 \ Pantaleoni legit \ 3022”
- “1♂: Sant’Anna Arresi: Porto Pino (CA) \ 30.VIII.2005 \ A. Molinu legit \ 2610”

28 ♀♀ in alcohol

- “Stintino: La Pelosa (SS) \ ex larva 22.VI.2004 \ Pantaleoni legit \ 3074”
- “Sorso: Platamona (SS) \ duna – ex larvae 21/22.V.1994 \ Pantaleoni legit \ 3710” [2 specimens]  
[Collection of Agostino Letardi, Rome]
- “Sorso: Platamona (SS) \ larva X.2003 \ sf. 31.V.2004 \ 2956”
- “ex larva: SARDEGNA \ Sassari: dune di \ Porto Ferro 30.XII.2007 (3a età) C. Cesaroni leg. \ (adulto sfarf. VII.2008)”  
[Collection of Rinaldo Nicoli Aldini, Bologna]
- “Sassari: P.to Ferro (SS) \ ex larva 27.VII.2008 \ C. Cesaroni legit \ 3.15 \ 4057”
- “Sassari: Porto Ferro (SS) \ duna 01.V.1999 – ex L III \ Pantaleoni legit \ 3292”
- “Sassari: P.to Ferro (SS) \ duna - ex L III 08.V.1999 \ Pantaleoni legit \ 3293”
- “Sassari: P.to Ferro (SS) \ duna – ex L III 26.VII.1999 \ sfarf. 15/25.VIII.1999 \ Pantaleoni legit \ 3385” [3 specimens]
- “Sassari: P.to Ferro (SS) \ duna – ex larva 22.VII.2000 \ Pantaleoni legit \ 3757”
- “Sassari: P.to Ferro (SS) \ primi pini – ex larva 22.VII.2000 \ Pantaleoni legit \ 3759”
- “Sassari: P.to Ferro (SS) \ duna – ex larva 27.VI.1997 \ Pantaleoni legit \ 3552”  
[Collection of the National Museum of Natural History, Sofia]
- “Alghero: Maria Pia (SS) \ duna spiaggia – ex larva 17.VI.2007 \ C. Cesaroni legit \ 4019”
- “Alghero: Maria Pia (SS) \ ex larva 10.II.2008 \ C. Cesaroni legit \ F2 \ 4054”  
[Collection of Victor Monserrat, Madrid]
- “Alghero: Maria Pia (SS) \ ex larva 10.II.2008 \ C. Cesaroni legit \ F3 \ 4055”
- “Alghero: Maria Pia (SS) \ ex larva 10.II.2008 \ C. Cesaroni legit \ mm9 \ 4056”
- “Alghero: Maria Pia (SS) \ ex larva 10.II.2008 \ C. Cesaroni legit” [2 specimens]  
[Collection of Horst and Ulrike Aspöck, Vienna]
- “Alghero: Maria Pia (SS) \ ex larva 19.IV.2008 \ C. Cesaroni legit \ F1 \ 4059”
- “Alghero: Lido (SS) \ pineta – ex larva 30.III.2000 \ Pantaleoni legit \ 3743”  
[Collection of the Natural History Museum, Vienna]
- “Alghero: Lido (SS) \ mezza via – ex larva 18.VI.2000 \ Pantaleoni legit \ 3752”
- “Lido (SS) \ ginepri – ex larva 18.VI.2000 \ Pantaleoni legit \ 3753”  
[Collection of Victor Monserrat, Madrid]
- “Narbolia: Is Arenas (OR) \ Dune – ex larva 29.V.2004 \ Pantaleoni legit \ 3075”
- “Narbolia: Is Arenas (OR) \ Dune – ex larva 29.V.2004 \ Pantaleoni legit \ 2.5 \ 3058”
- “SARDEGNA: Dune di Piscinas (VS) \ ex larva 16.VIII.2007 \ Davide Badano legit \ imbozzolamento: 20.VIII.2007 \ sfarf. 13.IX.2007”  
[Collection of Davide Badano, Arma di Taggia (Imperia)]
- “Sant’Anna Arresi: Porto Pino (CA) \ 28.VIII.2007 \ A. Molinu legit \ 3982”

2 ♂♂ pinned

- “ex larva: SARDEGNA \ Sassari: \ dune di Porto Ferro \ 30.XII.2007 (2a età) \ C. Cesaroni leg. \ (adulto sfarf. \ VII-VIII.2008) \ ♂”  
[Collection of Rinaldo Nicoli Aldini, Bologna]
- “ex larva: SARDEGNA \ Sassari: \ dune di Porto Ferro \ 2.IX.2007 \ C. Cesaroni leg. \ (adulto sfarf. \ VII-VIII.2008) \ ♂”  
[Collection of Rinaldo Nicoli Aldini, Bologna]

2 ♀♀ pinned

- “Isola Spargi \ Cala Corsaro \ 6.VIII.1986 \ B. Baccetti \ Sardegna N-E \ Arcipelago di \ La Maddalena (prov. SS) \ Myrmeleon ♀ \ inconspicuous Ramb. \ det. H. Hölzel, 1989 \ Museo Civico \ di Genova \ Myrmeleon sp. inquirenda \ non inconspicuous \ R. A. Pantaleoni det. 2001”  
[Collection of the Museo Civico di Storia Naturale “G. Doria”, Genoa]
- “ex larva: SARDEGNA \ (Sassari) \ Alghero: dune di Maria Pia \ 26.I.2008 (3a età) \ C. Cesaroni leg. \ (adulto sfarf. \ VII-VIII.2008) \ ♀”  
[Collection of Rinaldo Nicoli Aldini, Bologna]

## Localities

### SARDINIA (Italy)

- La Maddalena: Budelli [Olbia-Tempio = OT] 41°16'45"N 09°21'21"E
- La Maddalena: Spargi – Cala del Corsaro [Olbia-Tempio = OT] 41°13'47"N 09°20'45"E
- Aglientu: Rena Majore [Olbia-Tempio = OT] 41°10'28"N 09°10'19"E
- Stintino: La Pelosa [Sassari = SS] 40°57'58"N 08°12'30"E
- Sorso: Platamona [Sassari = SS] 40°49'14"N 08°30'03"E
- Sassari: Porto Ferro [Sassari = SS] 40°40'54"N 08°12'21"E
- Siniscola: La Caletta [Nuoro = NU] 40°36'02"N 09°45'02"E
- Alghero: Maria Pia [= Lido] [Sassari = SS] 40°35'04"N 08°18'30"E
- Narbolia: Is Arenas [Oristano = OR] 40°04'15"N 08°28'51"E
- Arbus: Pistis [Medio Campidano = VS] 39°41'21"N 08°27'14"E
- Arbus: Piscinas [Medio Campidano = VS] 39°32'56"N 08°27'14"E
- Buggerru: San Nicolao [Carbonia-Iglesias = CI] 39°26'02"N 08°24'48"E
- Buggerru: Cala Domestica [Carbonia-Iglesias = CI] 39°22'22"N 08°22'48"E
- Gonnessa: Porto Paglia [Carbonia-Iglesias = CI] 39°17'19"N 08°26'14"E
- Carloforte: La Caletta [Carbonia-Iglesias = CI] 39°06'58"N 08°15'26"E
- Giba: Porto Botte – Is Solinas [Carbonia-Iglesias = CI] 39°01'28"N 08°34'35"E
- Sant'Anna Arresi: Porto Pino [Carbonia-Iglesias = CI] 38°57'32"N 08°36'42"E

### TUNISIA

- Beja: Nefza – Zouaraa 37°01'41"N 08°54'45"E
- Jendouba: Tabarka 36°57'01"N 08°48'05"E
- Tunis: Gammarth 36°55'00"N 10°18'27"E
- Ben Arous: Soliman 36°43'10"N 10°26'01"E

## Ecological notes and distribution

In Sardinia, where the species has been studied in more detail, the larvae are only found on newly-formed sea-facing dunes almost always colonized by grassy vegetation; the presence of pits at the base of *Ammophila* plants is typical (figure 7). Only when an anthropic disturbance makes the dune habitat more un-



**Figure 7.** *Myrmeleon mariaemathildae* n. sp. habitat: A, landscape; B, pits [Sardinia: Arbus: Pistis; photos by Sarah Gregg].

stable, larvae can be found near trees on eroded dunes at the back of the beach. The established dunes, colonized by trees and shrubs of *Juniperus*, *Lentiscus*, *Quercus*, etc., as well as the sand at the bottom of layers of sandstone along coastline deriving from the erosion of the same sandstone, house the larvae of *Myrmeleon hyalinus* Olivier 1811. In pine woods or in shrub vegetation behind the dunes and along the sandbanks of more or less temporary streams, and also in agrosystems on a sandy soil, no matter how distant from the sea, *M. inconspicuus* is found instead. When present in the same area, *M. mariaemathildae* and *M. inconspicuus* show a perfect subdivision of the habitat, the former in the sunny dunes near the sea and the latter inland where tree cover starts. In only one case, where great anthropic disturbance overlapped with a very interesting naturalistic environment, *M. hyalinus* and *M. mariaemathildae* were found together (Sassari: Alghero: Maria Pia beach). In Tunisia *M. mariaemathildae* has the same behaviour. In some areas of peninsular Italy (Lazio, Apulia, Molise, Emilia Romagna), Sicily (Messina) and Albania (Valona) where we have been able to carry out research directly or through colleagues, the typical habitat of *M. mariaemathildae* is colonized by *M. inconspicuus*. Unusually, despite dedicated research and the presence of a suitable environment, *M. mariaemathildae* has not been found on the island of Asinara (NW Sardinia) (Molinu *et al.*, 2007) which is colonized apparently only by *M. inconspicuus*.

## Comments

The genus *Myrmeleon* Linnaeus 1767 has a cosmopolitan range and is the richest in species of the family. Stange (2004), in his recent and monumental Catalog of World Antlions, lists 176 species. Surprisingly, such an important taxon has never been subjected to revision. Not even for the Euro-Mediterranean area do we have detailed descriptions of all the taxa, of which even the

most recent are often inaccurate. Nevertheless, *M. mariaemathildae* is easily distinguishable from all the species of the West-Palaearctic area (*sensu* Aspöck *et al.*, 2001). Its distinction from all other species is possible on the basis of the evident external characteristics such as the pigmentation of the pronotum, pigmentation of the wing venation, the shape of the wings, size, overall colouring of the thorax and abdomen, etc. The cubital fork of the forewing in a more basal position than the fork of the Media posterior differentiates it without any doubt from the whole *fasciatus*-group [*Myrmeleon fasciatus* (Navás 1912); *Myrmeleon alternans* Brullé 1839; *Myrmeleon pseudohyalinus* Hölzel 1972; *Myrmeleon pseudofasciatus* Hölzel 1981] (Hölzel, 1981). The presence of *pilula axillaris* in the hindwing of the male differs from the *formicarius*-group (*Myrmeleon formicarius* Linnaeus 1767; *Myrmeleon noacki* Ohm 1965; *Myrmeleon gerlindae* Hölzel 1974) (Aspöck *et al.*, 1980) and from *Myrmeleon caliginosus* Hölzel *et* Ohm 1983 (see original description). The internal male genitalia (gonarcus-paramere complex = complex of gonocoxites 9 + gonocoxites 11 *sensu* Aspöck and Aspöck, 2007) differ from the *hyalinus*-group (*M. hyalinus* Olivier 1811; *Myrmeleon amicus* Hölzel *et* Ohm 1983; *Myrmeleon pellucidus* Hölzel 1988), from *Myrmeleon circumcinctus* Tjeder 1963 (Tjeder, 1963; Hölzel, 1986; 1988; Hölzel and Ohm, 1983) and from all the above species. The ectoproct without notch differs from the pair *Myrmeleon bore* (Tjeder 1941) and *Myrmeleon yemenicus* Hölzel 2002 [the latter does not seem to differ from *Myrmeleon saananus* (Navás 1934)] (Kuwayama, 1959; Meinander, 1962; Hölzel, 2002). The characteristics of the habitus, in particular the variegated abdomen, differ from the similar *Myrmeleon immanis* Walker 1853 (see, under *Grocus pallens* n. sp., Hölzel, 1970). The only species it could be confused with is therefore *M. inconspicuus* Rambur 1842 for which the differential characteristics are given in the next paragraph.

### Comparative notes

The adult of *M. mariaemathildae* can easily be distinguished from *M. inconspicuus* firstly by its general appearance. The new species is slightly smaller (*M. inconspicuus* has a forewing length of 21-26 mm according to Aspöck *et al.*, 1980) and is very much paler, both due to the dark pigmentation which tends to be brown instead of blackish, and due to the pale longitudinal sub-lateral stripe with faded margins which starts from the pronotum and goes round the base of the wings along the abdomen at the level of the pleural membranes (figure 1). There could be some doubt in the case of a darker specimen of *M. mariaemathildae*, but even in this case the pattern of the pronotum is still distinctive, with perceptible differences between the two species. In particular, the pale central stripe present in the anterior half of the pronotum always has sub-parallel margins in the new species instead of the divergent margins and triangular shape to be found in *M. inconspicuus* (figure 3). Even in cases where the periantennal mark, the frontal mark and the clypeal marks join more or less completely to form a single facial mark, the frontal sutures

(*sensu* Killington, 1936) are always spotless, contrary to *M. inconspicuus* where they are always reached and covered by the facial mark. The posterior femurs of *M. mariaemathildae* are always pale and have a dark external stripe and are never completely dark-coloured in the centre as in *M. inconspicuus*.

While awaiting a more detailed study of the larval stages of the genus *Myrmeleon*, the distinction between the larva of *M. mariaemathildae* and that of *M. inconspicuus* based on their general appearance and the arrangement of the digging-setae of the IX sternite is possible. *M. mariaemathildae* larvae exhibit a much paler basic colouring with a brown pattern made up of much less extensive marks. The number and the arrangement of the digging-setae, when compared with the information given by Principi (1943), Steffan (1975) and Nicoli Aldini (2007), are much more reliable discriminating elements. In *M. mariaemathildae* the general arrangement of the macrochaetae is decidedly less orderly (except for those on the palettes); the intermediate and anterior groups of macrochaetae are not often clearly distinguishable from one another, as instead is generally the case in *M. inconspicuus*, due to the presence of a variable number of macrochaetae reduced in size to a greater or lesser extent and arranged in a disorderly manner.

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