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## Research article

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# Three new species of *Anacharis* Dalman, 1823 (Hymenoptera: Figitidae), with revised taxonomy and distribution records of Palearctic and Indomalayan species

Noel MATA-CASANOVA<sup>\*1</sup>, Jesús SELFA<sup>2</sup> & Juli PUJADE-VILLAR<sup>3</sup>

<sup>1,3</sup> Universitat de Barcelona, Facultat de Biologia, Departament de Biologia Animal.  
Avda. Diagonal 645, 08028-Barcelona, Spain.

<sup>2</sup> Universitat de València, Facultat de Ciències Biològiques, Departament de Zoologia.  
Campus de Burjassot-Paterna, Dr. Moliner 50, E-46100 Burjassot (València), Spain.

\* Corresponding author: [feofitotu@gmail.com](mailto:feofitotu@gmail.com)

<sup>2</sup> Email: [jesus.selfa@uv.es](mailto:jesus.selfa@uv.es)

<sup>3</sup> Email: [jpujade@ub.edu](mailto:jpujade@ub.edu)

<sup>1</sup> [urn:lsid:zoobank.org/author:41ABC9C0-AB40-4D75-AB30-0CFC62704A05](https://zoobank.org/author:41ABC9C0-AB40-4D75-AB30-0CFC62704A05)

<sup>2</sup> [urn:lsid:zoobank.org/author:C01B4FA6-6C5C-4DDF-A114-2B06D8FE4D20](https://zoobank.org/author:C01B4FA6-6C5C-4DDF-A114-2B06D8FE4D20)

<sup>3</sup> [urn:lsid:zoobank.org/author:94C497E0-C6A1-48BD-819D-FE5A8036BECD](https://zoobank.org/author:94C497E0-C6A1-48BD-819D-FE5A8036BECD)

**Abstract.** An update of the current knowledge of *Anacharis* Dalman, 1823 for the Palearctic and Indomalayan regions is given. The previously known Palearctic species *Anacharis antennata* Belizin, 1951, *Anacharis eucharoides* (Dalman, 1818), *Anacharis immunis* Walker, 1835 and *Anacharis parapsidalis* Belizin, 1951 are redescribed. Three new species are described: *Anacharis fergussoni* sp. nov. from Europe, *Anacharis norvegica* sp. nov. from Norway and *Anacharis belizini* sp. nov. from Thailand, the first recorded Indomalayan species for the genus. *Anacharis gracilipes* Ionescu, 1969, is synonymized with *A. eucharoides*, while *Anacharis flavidicornis* Kieffer, 1910 is transferred to the genus *Aegilips* Haliday, 1835, resulting in *Aegilips flavidicornis* (Kieffer, 1910) comb. nov. Diagnostic characters and data about the biology, distribution and affinities with other species of *Anacharis* are discussed. An identification key for the Palearctic and Indomalayan species of *Anacharis* is given.

**Key words.** *Anacharis*, *Aegilips*, Palearctic, Indomalayan, new species, taxonomy.

Mata-Casanova N., Selfa J. & Pujade-Villar J. 2018. Three new species of *Anacharis* Dalman, 1823 (Hymenoptera: Figitidae), with revised taxonomy and distribution records of Palearctic and Indomalayan species. *European Journal of Taxonomy* 414: 1-25. <https://doi.org/10.5852/ejt.2018.414>

## Introduction

*Anacharis* Dalman, 1823 (Hymenoptera: Figitidae) is one of the nine genera included in the subfamily Anacharitinae (Mata-Casanova & Pujade-Villar 2013), the eight others being *Acanthaegilips* Ashmead, 1896, *Acanthaegilopsis* Pujade-Villar, 2013, *Aegilips* Haliday, 1835, *Calofigites* Kieffer, 1909,

*Hexacharis* Kieffer, 1907, *Proanacharis* Kovalev, 1996, *Solenofigites* Díaz, 1979, and *Xyalaspis* Hartig, 1843. Anacharitinae is one of the 12 subfamilies of the Figitidae (Paretas-Martínez *et al.* 2011), and are easily identified by three synapomorphies (Ros-Farré *et al.* 2000): (1) rounded and continuous pronotal plate; (2) broadly overlapping mandibles; and (3) triangle-shaped head in front view –although it is more quadrangular shaped in genus *Acanthaegilopsis*, *Proanacharis* and some species of *Xyalaspis* (Mata-Casanova *et al.* 2014a). Although they have been cited attacking the aphid-feeding larvae of the Neuroptera families Chrysopidae and Hemerobiidae (Ronquist 1999; Buffington *et al.* 2012), the biology of most Anacharitinae species is still unknown.

*Anacharis* is the second most diverse of the Anacharitinae genera after *Aegilips*, and includes 21 described species. *Anacharis* does not have a scutellar spine, a trait shared with *Aegilips*, *Calofigites*, *Hexacharis*, *Proanacharis* and *Solenofigites*. Among them, *Aegilips* and *Hexacharis* are the closer ones to *Anacharis* (Buffington *et al.* 2007, 2012), but can be distinguished from them by an elongated petiole (at least as long as metacoxa, usually longer) with smooth surface (Restrepo-Ortiz & Pujade-Villar 2010).

*Anacharis* has a cosmopolitan distribution, being present in all continents except for Antarctica. Twelve species of *Anacharis* were recorded for the Palaearctic region: *Anacharis antennata* Belizin, 1951, *Anacharis eucharoides* (Dalman, 1818), *Anacharis ensifera* Walker, 1835, *Anacharis flavidicornis* Kieffer, 1910, *Anacharis gracilipes* Ionescu, 1969, *Anacharis immunis* Walker, 1835, *Anacharis parapsidalis* Belizin, 1951, *Anacharis rufiventris* (Hartig, 1841), *Anacharis tincta* Walker, 1835 and *Anacharis typica* Walker, 1835. Fergusson (1986) based his revision on material from Dalman, Hartig, Walker, Westwood and undetermined material and concluded that *A. tincta* and *A. typica* were junior synonyms of *A. eucharoides*, while *A. ensifera* and *A. rufiventris* were junior synonyms of *A. immunis*. Thus, before the present study was carried out, the Palaearctic region comprised six valid species of the genus; on the other hand, *Anacharis* had not been cited for the Indomalayan (also known as Oriental) region yet.

*Anacharis flavidicornis* was described by Kieffer (1910) from Central Asia. The knowledge of Eastern Palaearctic *Anacharis* was extended by Belizin (1951), who cited *A. immunis* as occurring in the Russian Far East and described two new species: *Anacharis antennata* from Central Asia and *A. parapsidalis* from the Russian Far East. Belizin (1961) also cited *A. eucharoides* for the westernmost parts of Central Asia (Chelyabinsk Oblast in Russia). The Western portion of the Palaearctic region had a scarcer record of *Anacharis*, with only three species having been collected: *Anacharis eucharoides* and *A. immunis* cited from Eastern and Central Europe, and *A. gracilipes*, exclusively present in Romania.

In this study, we describe *A. belizini* sp. nov., *A. fergussoni* sp. nov., and *A. norvegica* sp. nov., the first one being the first Indomalayan species of the genus. The Palaearctic species *A. antennata*, *A. eucharoides*, *A. immunis* and *A. parapsidalis* are redescribed and their known distribution areas are extended, while *A. flavidicornis* is moved to *Aegilips* and *A. gracilipes* is described as a junior synonym of *A. eucharoides*. Diagnostic characters for these species are given, and data about morphological features, distribution area and biology are discussed.

## Material and methods

For this study 137 undetermined specimens were examined: 57 males and 80 females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré *et al.* (2003). All measurements are relative except for the body length. The antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The undetermined specimens examined in this study are from the NHM, CNC, MNHN and ULg (see below for abbreviations). The type material studied belongs to *Anacharis ensifera*, *A. flavidicornis*,

*A. gracilipes*, *A. immunis*, *A. tincta* and *A. typica* and is deposited in the NHM, MGAB and ZMB; additional material of *A. eucharoides* comes from LU and is deposited in CNC, LU, MNHN and UB.

The images included were made in the ‘Serveis Científico-Tècnics’ of the University of Barcelona. The field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

### Abbreviations

- F1–F12 = first and subsequent flagellomeres  
 LOL = lateral-frontal ocellar distance (distance between the edges of the lateral and frontal ocelli)  
 OOL = ocular-ocellar distance (shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus)  
 POL = post-ocellar distance (distance between the inner margins of the posterior ocelli)

### Institutional abbreviations

- CNC = Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada  
 LU = Lund University, Lund, Sweden  
 MGAB = Muzeul National de Istorie Naturală “Grigore Antipa”, Bucharest, Romania  
 MNCN = Museo Nacional de Ciencias Naturales, CSIC, Madrid, Spain  
 MNHN = Muséum national d’Histoire naturelle, Paris, France  
 NHM = Natural History Museum, London, UK  
 UB = Universitat de Barcelona, Spain  
 ULg = Université de Liège, Belgium  
 ZMB = Museum für Naturkunde, Berlin, Germany

### Results

Phylum Arthropoda von Siebold, 1848  
 Subphylum Hexapoda Blainville, 1816  
 Class Insecta Linnaeus, 1758  
 Order Hymenoptera Linnaeus, 1758  
 Superfamily Cynipoidea Billberg, 1820  
 Family Figitidae Hartig, 1840  
 Subfamily Anacharitinae Thomson, 1862

Genus *Anacharis* Dalman, 1823

### Key to the Palearctic and Indomalayan species of genus *Anacharis*

1. Notauli tenuous, almost entirely effaced in the anterior region of the mesoscutum, sometimes internally carinate (Figs 2C, 4D); petiole as long as metacoxa (Fig. 4F) ..... 2
  - Notauli excavated along their entire extension, and internally carinate; petiole longer than metacoxa ..... 3
2. Scutellum surface smooth to areolate, but never with small cells (Fig. 2C, E), median mesoscutal furrow absent, apex of scutellum with prominent tooth (Fig. 2F) ..... *A. immunis* Walker, 1835
  - Scutellum surface strongly areolate and covered with small cells (Fig. 4D), median mesoscutal furrow short and weakly excavated but always present, apex of scutellum without a tooth (Fig. 4E) ..... *A. norvegica* sp. nov.

3. Parascutal sulcus absent; in some cases a coarse band surrounding the mesoscutum is present instead (Figs 1B, 2D) ..... 4
  - Parascutal sulcus present, internally carinate, and completely surrounding the mesoscutum (Figs 1D, 3B, 4B) ..... 5
4. Mesoscutum completely smooth without any carinate sculpture; scutellum also smooth, with a short, median scutellar carinae at the apex of the scutellum; notauli strongly carinate (Fig. 1B) ..... *A. antennata* Belizin, 1951
  - Mesoscutum with some weak carinae at the edges of the notauli, extended to comprise the whole anterior region in some specimens; scutellum alutaceous, without short median scutellar carinae at the posterior margin of the scutellum; notauli not always carinate; if carinae are present, they are weak (Fig. 2A–B) ..... *A. eucharoides* (Dalman, 1818)
5. Pronotum smooth except for some short basal carinae (Fig. 4B) ..... *A. fergussoni* sp. nov.
  - Pronotum surface completely covered by strong carinate sculpture (Figs 1B, 3B) ..... 6
6. Scutellum strongly areolate (Fig. 1C), with only two basal parallel carinae; pronotum surface is covered by strong and irregular coarse sculpture (Fig. 1D) ..... *A. parapsidalis* Belizin, 1951
  - Scutellum smooth with a short median scutellar carinae at the apex of the scutellum (Fig. 3C); pronotum surface crossed by oblique parallel carinae (Fig. 3B) ..... *A. belizini* sp. nov.

*Anacharis antennata* Belizin, 1951  
Fig. 1A–B

**Diagnosis**

Species very similar to *A. eucharoides*, from which it can be distinguished by always having a completely smooth mesoscutum and scutellum, strongly carinate notauli, with a short median scutellar carina at scutellar apex (mesoscutum and notauli weakly carinate in some specimens of *A. eucharoides* while smooth in others, the scutellum is alutaceous and lacks median carina).

**Type material**

Holotype. TAJIKISTAN: ♂, Kondara, with the following labels: “Kondara, Tadzhih SSR, 9.IX.1945, V. Gussakovskij” (white label, handwritten, in Cyrillic); “Holotype *Anacharis antennata* ♂, V. Belizin det” (red label, handwritten) (ZIN).

**Type locality**

TAJIKISTAN: Kondara,

**Material examined**

JAPAN: 1 ♂, Fukota Hakozaiki, Kyushu, PT, 16–24 Aug. 1979, K. Yamagishi leg.; 1 ♀, Ibaraki Tsukuba, 15–25 Jul. 1989, M.J. Sharkey leg. (both CNC).

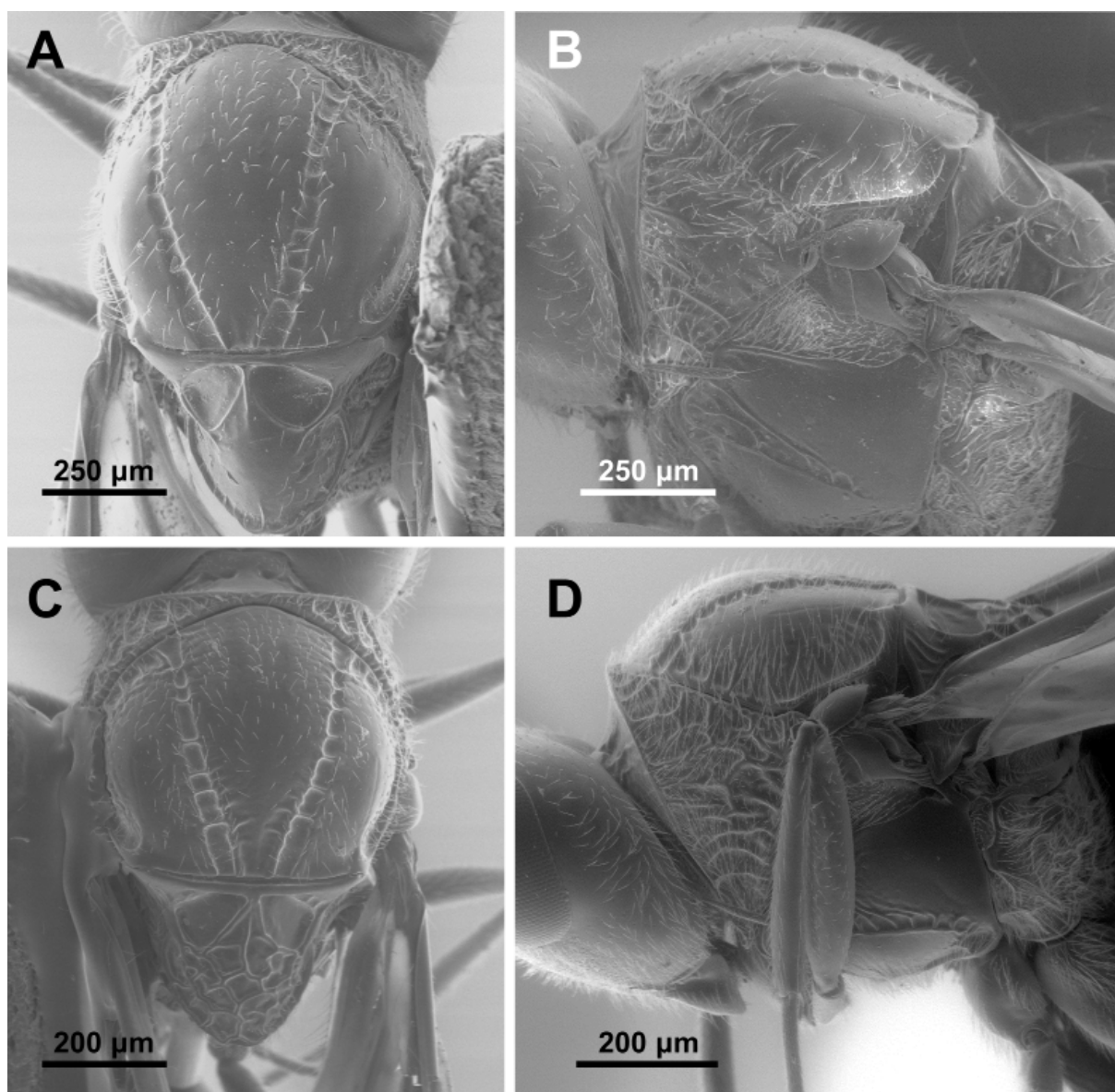
**Redescription**

LENGTH. Body: 4.4 mm. Antennae: 3.5 mm (♀), 3.6 mm (♂). Wings: 4.1 mm.

COLORATION. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark brown with first segment black. Legs yellowish brown with black coxae. Veins of wings brownish.

**HEAD.** Triangular-shaped in anterior view. Face smooth, punctate, covered with sparse white setae. Width of head 2.3 times its length in dorsal view while in anterior view, 1.2 times its height. Malar sulcus coriaceous, 0.7 times height of compound eye. Transfacial line length 1.1 times height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous, shortly convex, almost unnoticeable. Occipital and postocular carinae absents. Compound eyes glabrous. In females POL:OOL:LOL ratio = 8.5:7.5:4, ocelli diameter being 2.5; in males POL:OOL:LOL ratio = 8:6:5, ocelli diameter being 3 . Frons and gena smooth, shiny and glabrous; occiput smooth and shiny with sparse setae.

**ANTENNAE.** Cylindrical flagellomeres covered with pubescence. Female antennal formula: 12(4), 4.5(3.5), 14(3), 14(3), 12(3), 12(3), 12(3), 11(3), 10(3), 10(3), 9(3), 8(3), 13(3). Male antennal formula:



**Fig. 1.** A–B. *Anacharis antennata* Belizin, 1951, mesosoma. A. Dorsal view. B. Lateral view. – C–D. *A. parapsidalis* Belizin, 1951, mesosoma. C. Dorsal view. D. Lateral view.

9(4), 4(3.5), 13(3.5), 12.5(3.5), 12(3.5), 11.5(3.5), 10(3), 10(3), 10(3), 10(3), 9(3), 9(3), 9(3), 13(3). Placodeal sensilla starting at F1 and abundant in all flagellomeres in both sexes.

**MESOSOMA.** Pronotum smooth and pubescent, with some oblique carinae in ventral region (Fig. 1B). Mesoscutal width 1.1 times its length in dorsal view. Mesoscutum smooth and shiny; almost glabrous except for a few setae. Notauli complete with transverse carinate sculpture; median mesoscutal furrow short and almost not present (Fig. 1A). Lateral region of mesoscutum smooth; parapsidal signum and parascutal sulcus absent, with a line of dense pubescence instead. Scutellar length 0.7 times that of mesoscutum in dorsal view. Scutellum smooth and shiny (Fig. 1A). Scutellar foveae triangular, smooth, basally defined by a carina; lateral pits of scutellar foveae present, but weakly excavated. Interfoveal line present, shortly extended into scutellum. Short median scutellar carinae present at scutellum apex. Circumscutellar carina complete, clearly defined, slightly dorsally projected at scutellar apex. Mesopleuron completely smooth, glabrous and shiny, with internally carinate transverse groove; carinae more abundant in posterior region; mesopleural triangle presents dense pubescence. Metanotal troughs heavily pubescent, smooth, densely covered by short hyaline hairs. Propodeum smooth, heavily pubescent, divided into large cells; median propodeal cell present, occupying  $\frac{2}{3}$  of upper propodeum, rest of propodal surface divided into irregular, smaller cells.

**WINGS.** Pubescent. Radial cell of forewing closed, 2.9 as long as wide. Marginal pubescence of forewing denser at apical third.

**METASOMA.** Longer than head + mesosoma. Petiole, smooth, shiny about 2.0 times as long as metacoxa. Third metasomal tergum 2.3 times longer than fourth tergum in dorsal view. Fifth, sixth, seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, not punctate.

### **Biology**

Unknown.

### **Distribution**

Palearctic. Known from Tajikistan (Belizin 1951); first citation for Japan.

### *Anacharis eucharoides* (Dalman, 1818)

Fig. 2A–B, D

*Cynips eucharoides* Dalman, 1818: 78. Type material lost, according to Fergusson (1986).

*Anacharis tinctus* Walker, 1835: 520. Synonymized by Fergusson (1986). Type examined.

*Anacharis typicus* Walker, 1835: 520.

*Megapelmus spheciformis* Hartig, 1840: 202.

*Anacharis gracilipes* Ionescu, 1969: 75, fig. 27. syn. nov. Type examined.

*Anacharis eucharoides* – Dalman 1823: 96.

*Anacharis typica* – Walker in Reinhard 1860: 215. Synonymized by Fergusson (1986). Lectotype examined.

*Anacharis spheciformis* – Hartig in Giraud 1860: 170. Synonymized by Fergusson (1986).

### **Diagnosis**

Species morphologically very similar to *A. antennata*, except for some weak transverse carinae at the edges of the notauli, alutaceous scutellum and a weak posterior carina on the scutellar foveae (in *A. antennata*, mesoscutum and scutellum smooth, scutellar foveae defined by a strong posterior carina).

### Type material

Type material of *Anacharis eucharoides*: lost (Fergusson 1986).

Type material of *Anacharis tincta*. Lectotype ♂, collected in United Kingdom, location not specified (Walker 1835), with the following labels: “B. M. 1981 under *tincta*” (white label); “Lectotype *Anacharis tincta* Walker, det. N.D.M. Fergusson, 1981” (white label); B. M. Type Hym. 7.162” (white label) (NHM).

Type material of *Anacharis typica*. Lectotype ♀, collected in United Kingdom, location not specified (Walker 1835), with the following labels: “In coll. under *typica*” (white label); “B. N. 1981 under *typica*” (white label); “Lectotype *Anacharis typica* Walker, det. N.D.M. Fergusson, 1981” (white label); “B. M. Type Hym. 7.163” (white label) (NHM).

Type material of *Anacharis gracilipes*. Lectotype ♀, collected at Rarau Mountains, Romania (Ionescu 1969), with the following labels: “26.VII.1956, Rarău” (white label); “*Anacharis eucharoides* ♀ (Dalman, 1818), N. Mata-Casanova det. 2014” (MGAB). Paralectotype ♀, Pădurea Greci, 5 Jul. 1961 (MGAB).

### Type locality

SWEDEN: Västergötland.

### Material examined

(35 ♀♀, 27 ♂♂: 3 ♀♀ & 1 ♂ deposited in NHM; 6 ♀♀ & 4 ♂♂ deposited in CNC; 6 ♀♀ & 3 ♂♂ deposited in MNHN; 8 ♀♀ & 1 ♂ deposited in LU; 1 ♀♀ & 1 ♂ deposited in ULg; 11 ♀♀ & 17 ♂♂ deposited in UB).

MOROCCO: 1 ♀, Marrakech Ouirgane, 1000 m a.s.l., MT, 22–29 Oct. 1996, C. Kaseebeer leg. (CNC).

ANDORRA: 1 ♂, Santa Coloma, MT, Aug. 1992, J. Pujade leg. (UB); 1 ♂, Santa Coloma, MT, Oct. 1992, J. Pujade leg. (UB); 1 ♀, Santa Coloma, MT, 16–30 Jul. 1993, J. Pujade leg. (UB).

FRANCE: 2 ♀♀, Til-Châtel, 25 km N of Dijon, 7 Sep. 1979, Bouček leg. (NHM); 1 ♀, Collioure, Pyreneés Orientales, 29 Feb. 1984, C. Delvare leg. (NHM); 1 ♀, Valdeblore, Col de Salèse, 11–24 Jun. 2009 (MNHN); 1 ♂, Valdeblore, le Boréon, 11–24 Jun. 2009 (MNHN); 1 ♀, Saint-Dalmas-le-Selvage, Vallon de Saint-Dalmas, 10–23 Jul. 2009 (MNHN); 1 ♂, Saint-Dalmas-le-Selvage, Vallon de Sestrière, 10–23 Jul. 2009 (MNHN); 1 ♀, 1 ♂, Valdeblore, Col de Salèse, MT, 24 Jul.–13 Aug. 2009 (MNHN); 1 ♀, Valdeblore, Col de Salèse, MT, 13–27 Aug. 2009 (MNHN); 2 ♀♀, Valdeblore, le Boréon, 13–27 Aug. 2009 (MNHN).

UNITED KINGDOM: 1 ♂, Toraguay, 25 Jun. 1960, J.R. Vocherath leg. (NHM).

BELGIUM: 1 ♀, 1 ♂, Somal, 28 May 2013, P.N. Libert leg. (ULg).

ITALY: 2 ♀♀, Abruzzo, L’Aquila, 20 Jun. 1992, John D. Pinto leg. (CNC).

SWITZERLAND: 1 ♂, Solothun, Hinter Weißenstein, 1250 m a.s.l., 45°15’2” N, 7°29’15” E, 17 Jun. 1999, Goulet leg. (CNC).

GERMANY: 1 ♂, Mainz, 26 Aug.–3 Sep. 1965, A.W. Steffan leg. (CNC); 1 ♀, Mainz, 18 Sep.–1 Oct. 1965, A.W. Steffan leg. (CNC).



CZECH REPUBLIC: 1 ♂, 2 ♀♀, Moravia, R. V. Dyje nr. Znojmo, 12 Sep. 1991, L. Masner leg. (CNC).

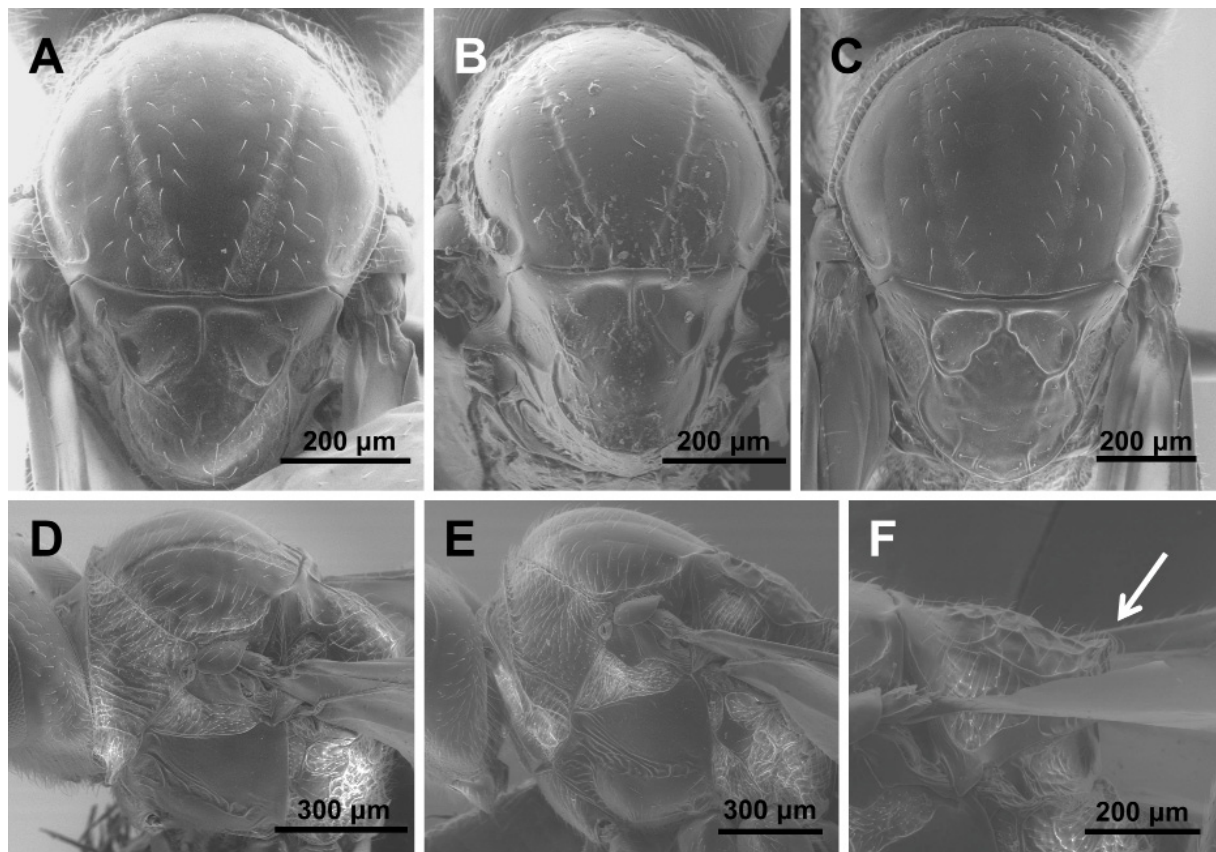
HUNGARY: 1 ♀, Kelebia, 5 Oct. 1949, Erdős leg. (UB); 1 ♂, Mátra, 25 Jun. 1952, Erdős leg. (UB); 1 ♂, Börzsöny, 16 Aug. 1956, Erdős leg. (UB); 1 ♀, Börzsöny, W. Hideghedy, 15 Jun. 1957, Erdős leg. (UB); 1 ♀, Bükk, 28 Aug. 1957, Erdős leg. (UB); 1 ♂, Tataváros, 26 May 1959, Sólymosne leg. (UB); 1 ♂, Fót, 19 Sep. 1960, Mihályi leg. (UB); 1 ♂, Mátra, 5 Jul. 1962, Erdős leg. (UB); 1 ♀, 1 ♂, Pilis, 24 Aug. 1962, Erdős leg. (UB); 3 ♂♂, Vas m. Orseg, Szalafo-Felsoszer, 1 Jul. 1994, Kotenko A. leg. (UB); 1 ♂, Vas m. Cák, 8 Jul. 1994, Kotenko A. leg. (UB); 1 ♂, Vas Co., Hörmann forr., 27 Jul. 1996, Cs. Thuróczy leg. (UB).

ROMANIA: 1 ♀, Hargita Co., Kiruly Valley, 10 Jul. 2000, Zoltán Acs leg. (UB); 1 ♂, Hargita Co., Kiruly Valley, 15 Aug. 2000, Zoltán Acs leg. (UB).

RUSSIA: 1 ♂, Caucasus, Temmolesskaya, 700 m a.s.l., 25 Jul. 1999, V. Gebrennikov leg. (CNC).

SWEDEN: 1 ♀, Norbottens Lan. Nat. Park, 10 Aug. 1999, G. Melika leg. (UB); 1 ♂, 2 ♀♀, on Road 276 nr. Kvista, 18 Aug. 1999, G. Melika leg. (UB); 1 ♂, 8 ♀♀, with no specified location (LU).

NORWAY: 1 ♀, Oppdal, Kongsvoll, Blesbekken, MT, 4 Sep. 1980, J.O. Solem (UB); 1 ♂, Oppdal, Kongsvoll, Raubekken, 900 m a.s.l., MT, 25 Aug. 1981, J.O. Solem (UB); 1 ♀, Oppdal, Kongsvoll, Gabaljbk, MT, 10 Aug. 1982, J.O. Solem (UB).



**Fig. 2.** A–C. Mesosoma in dorsal view. A–B. *Anacharis eucharoides* (Dalman, 1818). C. *A. immunis* Walker, 1835. – D–F. Mesosoma in lateral view. D. *A. eucharoides* (Dalman, 1818). E–F. *A. immunis* Walker, 1835, F is detail of scutellum.



**Redescription**

LENGTH. Body: 3.2 mm. Antennae: 2.8 mm (♂), 2.1 mm (♀). Wings: 2.8 mm.

COLORATION. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark yellowish brown. Legs yellowish brown with darker coxae. Veins of wings dark brown.

HEAD. Triangular-shaped in anterior view. Face smooth, covered with sparse white setae. Width of head 2 times its length in dorsal view and 1.3 times its height in anterior view. Malar sulcus coriaceous, 0.6 times height of compound eye. Transfacial line same length as height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous, shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. In both sexes POL:OOL:LOL ratio = 7:4:4, ocelli diameter being 2.5. Frons, gena and occiput smooth, shiny and glabrous except for few sparse setae.

ANTENNAE. Cylindrical flagellomeres covered with pubescence. Male antennal formula: 8(4), 3.5(3), 12(3), 10(3), 9(3), 9(2.5), 9(2.5), 9(2.5), 8(2.5), 8(2.5), 8(2), 7.5(2), 7.5(2), 10(2). Female antennal formula: 7(3), 4(2.5), 9.5(2), 8(2), 7.5(2), 7(2), 7(2), 7(2), 6.5(2), 6(2), 6(2), 6(2), 10(2.5). Placodeal sensilla start at F1 in both sexes.

MESOSOMA. Pronotum smooth, shiny, with some lower transverse carinae, covered by short white setae (Fig. 2D). Mesoscutal width 1.2 times its length in dorsal view. Mesoscutum smooth and shiny, almost glabrous except for a few setae; some weak transverse carinae at edges of notauli, extended in anterior region between notauli in some specimens (Fig. 2A–B). Notauli complete and clearly excavated; transverse internal carinae ranging from being absent (Fig. 2A) to present (Fig. 2B); median mesoscutal furrow absent. Lateral region of mesoscutum smooth except for a few isolated punctures; parapsidal signum and parascutal sulcus, absent. Scutellar length 0.8 times that of mesoscutum in dorsal view. Scutellum alutaceous, never areolate (Fig. 2A–B). Scutellar foveae rounded, large, alutaceous, with short oblique internal ridges in some specimens, basally defined by weak carina (Fig. 2A–B); lateral pits of scutellar foveae absent. Interfoveal line present. Circumscutellar carina complete, clearly defined, not projected at scutellar apex. Mesopleuron smooth, glabrous, shiny, with transverse groove not internally carinate; some anterior oblique carinae present. Mesopleural triangle smooth, densely pubescent. Metanotal troughs alutaceous, glabrous. Propodeum coriaceous, pubescent, divided into large cells; central area with one large upper cell partially divided by median carina and four lesser smaller cells.

WINGS. Pubescent. Radial cell of forewing closed, 2.6 times as long as wide. Marginal pubescence of forewing denser at apical third.

METASOMA. Longer than head + mesosoma. Petiole longer than metacoxa, smooth, shiny, weak dorsal carinae present in last third of the petiole. Third metasomal tergum 2.5 times as long as fourth tergum in dorsal view. Fifth, sixth, seventh metasomal terga visible in dorsal view. Metasomal terga smooth, glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

**Taxonomic remarks**

The holotype of *A. eucharoides* is lost (Fergusson 1986); we studied the lectotypes *A. tincta* and *A. typica* designated by Fergusson (1986) instead. Regarding *A. gracilipes* syn. nov., in the original work of Ionescu, the different coloration and longer radial cell and petiole are cited as differences for establishing a new species. After examining the type material of *A. gracilipes* as well as the lectotypes of *A. eucharoides* designated by Fergusson and series of undetermined material, we concluded that the coloration alone cannot be taken into account when distinguishing between species, and the morphometric differences cited by Ionescu (1969) fall within the ranges of intraspecific variability.

## Biology

Known to attack *Hemerobius micans* Olivier, 1792, *Wesmaelius betulinus* (Ström, 1788) and *W. subnebulosus* (Stephens, 1836) (Fergusson 1986).

## Distribution

Palearctic. Known from Sweden (Dalman 1818; Zetterstedt 1838); United Kingdom (Walker 1835); Austria (Giraud 1860); France (Hedicke 1914); Netherlands and Germany (Dalla-Torre & Kieffer 1910); Russia (Belizin 1951); Georgia (Belizin 1961); Romania (Ionescu 1969); first citation for Morocco, Andorra, Belgium, Italy, Switzerland, Czech Republic, Hungary and Norway.

### *Anacharis immunis* Walker, 1835

Fig. 2C, E–F

*Anacharis immunis* Walker, 1835: 521. Type examined.

*Anacharis ensifer* Walker, 1835: 522.

*Cynips petiolata* Zetterstedt, 1838: 409. Synonymized by Fergusson (1986).

*Megapelmus rufiventris* Hartig, 1841: 358.

*Anacharis staegeri* Dahlbom, 1842: 4. Synonymized by Dalla-Torre (1893).

*Synopsis aquisgranensis* Förster, 1869: 361.

*Anacharis ensifera* – Walker in Reinhard 1860: 217. Synonymized by Fergusson (1986). Type examined.

*Anacharis rufiventris* – Giraud 1860: 171. Synonymized by Fergusson (1986).

*Prosynopsis aquisgranensis* – Dalla-Torre & Kieffer 1910: 45. Synonymized by Kierych (1984).

## Diagnosis

Species easily distinguishable from most Eurasian species of *Anacharis* by the weakly excavated notauli which tend to disappear in its anterior region in some individuals (in *A. antennata*, *A. eucharoides*, *A. parapsidalis*, *A. belizini* sp. nov. and *A. fergussoni* sp. nov., notauli always complete, deeply excavated, internally carinate). This character is also shared with *A. norvegica* sp. nov., but *A. immunis* can be distinguished by always having a smooth mesoscutum and big cells in the scutellum (mesoscutum carinate in its anterior region and scutellum densely covered by small cells in *A. norvegica* sp. nov.).

## Type material

Type material of *Anacharis immunis*. Lectotype ♂ with the following labels: “*immunis*, Walker” (white label); “In coll. under *immunis*” (white label); “Lectotype of *A. immunis* Walker det. N. D. M. Fergusson, 1981” (white label); “B. M. Type Hym. 2.160” (white label) (NHM).

Type material of *Anacharis ensifera*. Lectotype ♀ with the following labels: “F. Walker coll, 81-86” (white label); “In coll. 1981 under *ensifera*” (white label); “Lectotype of *A. ensifera* Walker det. N.D.M. Fergusson, 1981” (white label); “B. M. Type Hym. 7.161” (white label) (NHM).

## Type locality

Unknown.

## Material examined

(7 ♀♀ & 7 ♂♂: 3 ♀♀ & 5 ♂♂ deposited in CNC; 3 ♀♀ & 1 ♂ deposited in ULg; 1 ♀ & 1 ♂ deposited in UB).

ANDORRA: 1 ♀, Santa Coloma, MT, Aug. 1992, J. Pujade leg. (UB).

BELGIUM: 1 ♀, Somal, 26 Sep. 2009, P.N. Libert leg. (ULg); 2 ♂♂, Somal, 27 May 2013, P.N. Libert leg. (UB, ULg). 2 ♀♀, Somal, 28 May 2013, P.N. Libert leg. (ULg).

GERMANY: 1 ♀, Mainz, 26 Aug.–3 Sep. 1965, A.W. Steffan leg. (CNC).

DENMARK: 1 ♂, S-Zealand, Feddent nr. Pastro, 27 Jul. 1994 (CNC); 1 ♀, W. Zealand, Woodat bromme, 28 Aug. 1994, Munk and Sharkey leg. (CNC).

SWEDEN: 1 ♂, Uppsala, Hagadalen, MT, 1–10 Aug. 1990, F. Ronquist leg. (CNC); 1 ♂, Uppsala, Hagadalen, MT, 1–17 Aug. 1990, F. Ronquist leg. (CNC); 1 ♀, Uppsala, Hagadalen, MT, 26 Aug.–5 Sep. 1990, F. Ronquist leg. (CNC).

NORWAY: 1 ♀, Oppdall, Kongsvoll, Raubekken, 900 m a.s.l., MT, 31 Jul. 1980, J.O. Solem leg. (UB).

RUSSIA: 1 ♂, Yakutia, Cherskiy, MT, 15–20 Jul. 1990, D.N. Wood leg. (CNC).

JAPAN: 1 ♂, Hokkaido, Sapporo, Jozankei, 350 m a.s.l., 20–31 Jul. 1989, K. Maeto and M. Sharkey leg. (CNC).

### Redescription

LENGTH. Body: 2.9 mm. Antennae: 2.7 mm (♂), 2.3 mm (♀). Wings: 2.6 mm.

COLORATION. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown. Legs yellowish brown with darker coxae. Veins of wings yellowish.

HEAD. Triangular-shaped in anterior view. Face smooth, covered with white setae denser at malar area. Width of head 1.7 its times length in dorsal view and 1.3 times its height in anterior view. Malar sulcus coriaceous, 0.5 times height of compound eye. Transfacial line same length as height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous, shortly convex. Occipital and postocular carinae absent. Compound eyes glabrous except for a few short setae. In both sexes POL:OOL:LOL ratio = 7:4:3, ocelli diameter being 2.5. Frons, gena and occiput smooth, shiny and glabrous except for few sparse setae.

ANTENNAE. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(3.5), 3.5(3), 10.5(2.5), 10(2.5), 8(2.5), 7(2.5), 6.5(3), 6.5(3), 6(3), 6(3), 6(3), 11(3). Male antennal formula: 8(3.5), 3.5(3.5), 9.5(2.5), 8(2.5), 8(2.5), 7.5(2.5), 7(2.5), 7(2.5), 7(2.5), 6.5(2.5), 6(2.5), 6(2), 9(2). Placodeal sensilla start at F4 in females and F1 in males.

MESOSOMA. Pronotum smooth, punctate, covered by pubescence denser in its dorsal region; short carinae at base of pronotum (Fig. 2E) so reduced to being almost unnoticeable in some specimens. Mesoscutal width 1.2 times its length in dorsal view. Mesoscutum smooth to slightly alutaceous, shiny, almost glabrous except for few setae in its anterior third. Notauli weakly excavated, not internally carinate, complete in some specimens, but effaced in anterior third of mesoscutum in others (Fig. 2C); median mesoscutal furrow absent. Parapsidal signum, parascutal sulcus, absent. Scutellar length 0.6 to 0.7 times that of mesoscutum in dorsal view. Scutellar sculpture highly variable: in some specimens, scutellum areolate, while in some others smooth to slightly alutaceous. Scutellar foveae triangle-shaped and smooth, basally defined by a weak carina which can be distinct or almost unnoticeable; lateral pits of scutellar foveae absent. Interfoveal line present. Circumscutellar carina complete, clearly defined, raised tooth projected at scutellar apex (Fig. 2F). Mesopleuron smooth, glabrous, shiny,

with internally carinate transverse groove; some oblique carinae next to edge of pronotum, in some individuals slightly coriaceous. Mesopleural triangle smooth, pubescent. Metanotal troughs internally carinate, in some specimens carinae extended across all surface. Propodeum strongly alutaceous, pubescent; large central cell longitudinally divided by incomplete median carina, presence of weaker transverse carinae.

WINGS. Pubescent. Radial cell of forewing closed, 2.9 times as long as wide. Marginal pubescence of forewing denser at apical third.

METASOMA. Shorter than head + mesosoma. Petiole as long as metacoxa, smooth and shiny. Third metasomal tergum 2.8 times longer than fourth tergum in dorsal view. Fifth, sixth, seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

### Taxonomic remarks

*Anacharis immunis* and *A. ensifera* were described as separate species by Walker (1835). In Fergusson (1986) they were synonymized. After examining the type material and series of undetermined material, we conclude that *A. immunis* is a valid species with a high variability in the scutellar sculpture (from completely smooth to softly areolate) and in the scutellar foveae (clearly defined by a carina in some specimens while in others there is a coarse band at the base of the foveae instead of the basal carina). The holotype of *A. immunis* has a smooth scutellum and scutellar foveae without basal carina, while the lectotype of *A. ensifera* has an areolate scutellum and a basal carina in the scutellar foveae; other specimens reflect intermediate states of those characters. The other synonymy established by Fergusson was *A. rufiventris*, but we could not examine the type material.

Fergusson (1986) mentioned the petiole of females being shorter than the metacoxa, while it is as long as the metacoxa in males. After examining the type material and other specimens we did not see the differences mentioned by Fergusson; both sexes present the petiole as long as the metacoxa.

### Biology

Known to attack *Hemerobius nervosus* Fabricius, 1793 and *Wesmaelius subnebulosus* (Kierich, 1984).

### Distribution

Palearctic. Known from the United Kingdom (Walker 1835; Evenhuis 1964; Fergusson 1986); Austria, Germany, Norway and Sweden (Dalla-Torre & Kieffer 1910); Latvia and Russia (Belizin 1951); Armenia and Ukraine (Belizin 1961); Finland and Poland (Kierych 1984); first citation for Andorra, Belgium, Denmark and Japan.

*Anacharis parapsidalis* Belizin, 1951

Fig. 1C–D

### Diagnosis

Species easily distinguishable from other Palearctic *Anacharis* species by the strongly areolate scutellum and coarsely sculptured pronotum (pronotum smooth with some weak basal carinae and scutellum smooth to alutaceous, sometimes presenting weak carinae at the margins but never strongly areolate in *A. antennata*, *A. eucharoides* and *A. immunis*).

### Type material

RUSSIA: Holotype, ♀, with the following labels: “Khabarovskij kraj: Nihno-Tambovskoye, r. Kul’ku, 28.VII.1911, V. Sovlatov j” (white label, handwritten, in Cyrillic); “Holotype *Anacharis parapsidalis* ♂, V. Belizin det” (red label, handwritten) (ZIN).

### Type locality

RUSSIA: Nihno-Tambovskoye, Khabarovsk kraj.

### Material examined

(5 ♀♀ & 4 ♂♂: 3 ♀♀ & 2 ♂♂ deposited in CNC; 2 ♀♀ & 2 ♂♂ deposited in UB).

ROMANIA: 1 ♀, Transylvania, Mt. Gyimes, Középlak, Sötét-patak, 1300 m a.s.l., 19 Jul. 1990, Cs. Thuróczy leg. (CNC).

JAPAN: 1 ♂, Mt Hiko, Fukukoa, 700 m a.s.l., 28 Apr.–10 May 1989, M.J. Sharkey leg. (CNC); 1 ♀, Horoha, Hokkaido, 800 m a.s.l., 5 Jul. 1989, M.J. Sharkey leg. (CNC); 1 ♀, 1 ♂, Jozankei, Sapporo, Hokkaido, 350 m a.s.l., 20–31 Jul. 1989, K. Maeto and M. Sharkey leg. (UB); 1 ♂, Mt Hiko, MT, 18–25 Sep. 1989, Takeno and M.J. Sharkey leg. (UB); 2 ♀♀, Jozankei, Sapporo, Hokkaido, 350 m a.s.l., MT, 21–29 Sep. 1989, K. Maeto and M. Sharkey leg. (CNC); 1 ♂, Mt below Pyoton, Hidaka, Hokkaido, 500 m a.s.l., 14 Jul. 1996, L. Masner leg. (CNC).

### Redescription

LENGTH. Body: 3.8 mm. Antennae: 3.2 mm (♀), 3.3 mm (♂). Wings: 3.2 mm.

COLORATION. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown with darker first segment. Legs yellowish brown, coxae dark brown. Veins of wings dark yellow.

HEAD. Triangular-shaped in anterior view. Face smooth, covered with abundant white setae. Width of head 1.3 times its height in front view and 2.3 times its length in dorsal view. Malar sulcus coriaceous, 0.7 times height of compound eye. Transfacial line 1.1 times of height compound eye. Diameter of toruli equal to inter-toruli distance and bigger than torulus to compound eye distance. Clypeus shortly defined, smooth, glabrous, shortly convex. Occipital and postocular carinae absent. Compound eyes glabrous. In both sexes, POL:OOL:LOL ratio 8:6:4, ocelli diameter being 3. Frons alutaceous, gena and occiput smooth and shiny with sparse setae.

ANTENNAE. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(3.5), 4.5(3), 13.5(3), 12.5(3), 10(3), 10(3), 10(3), 9(3), 9(3), 8.5(3), 8(3), 7(3), 11(3). Male antennal formula: 9(4), 4(3.5), 14(3.5), 13(3.5), 12.5(3.5), 12(3.5), 11(3), 11(3), 10(3), 10(3), 10(3), 10(3), 9(3), 13(3). Placodeal sensilla starting at F1 in both sexes.

MESOSOMA. Pronotal plate alutaceous. Pronotum strongly alutaceous, pubescent, carinate in all its surface: ventrally obliquely carinate, dorsally irregularly carinate (Fig. 1D). Mesoscutal width 1.1 times length in dorsal view. Mesoscutum alutaceous, some weak carinae between notauli, specially in anterior mesoscutum and base of notauli (Fig. 1C). Notauli complete with transverse carinate sculpture; median mesoscutal furrow short, almost entirely effaced. Parapsidal signum very short, forming elongated sulcus; parascutal sulcus slightly excavated, internally carinate, more defined at anterior region of mesoscutum. Scutellar length 0.6 times that of mesoscutum length in dorsal view. Scutellum alutaceous, divided into cells by strong carinae (Fig. 1C). Scutellar foveae triangular, smooth, basally defined by a carina; lateral pits of scutellar foveae absent. Interfoveal line present but short. Circumscutellar carina

complete, clearly defined, raised tooth dorsally projected at scutellar apex. Mesopleuron glabrous and shiny, anteriorly coriaceous; with internally carinate transverse groove, some carinae surpassing groove and reaching anterior margin of mesopleuron (Fig. 1C); mesopleural triangle smooth, densely pubescent. Metanotal troughs present dense pubescence. Propodeum slightly alutaceous, heavily pubescent, divided into large cells; central area divided into two halves separated by a median carina and asymmetrically divided by some weak transverse carinae.

WINGS. Pubescent. Radial cell of forewing closed, 2.4 times as long as wide. Marginal pubescence of forewing denser at the apical third.

METASOMA. Longer than head + mesosoma. Petiole about 2.0 times as long as metacoxa, smooth and shiny. Third metasomal tergum 1.8 times as long as fourth tergum in dorsal view. Fifth, sixth, seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, not punctate.

### Biology

Unknown.

### Distribution

Palearctic. Known from Russia (Belizin 1951); first citation for Romania and Japan.

### Comments

According to our sources, the type material of *A. antennata* was deposited in the Zoological Institute of St. Petersburg (ZIN), but is now lost. The specimens of our study were determined with the help of Belizin's original descriptions.

*Anacharis belizini* Mata-Casanova & Pujade-Villar sp. nov.

[urn:lsid:zoobank.org:act:DA38CC82-E929-42A4-ACA7-BF716F35F0A4](https://zoobank.org/act:DA38CC82-E929-42A4-ACA7-BF716F35F0A4)

Fig. 3A–D

### Diagnosis

Species similar to *A. antennata*, from which it can be distinguished by having parallel oblique ridges covering most of the pronotal surface (pronotum carinate sculpture reduced only to a few short ridges at the lower region in *A. antennata*).

### Etymology

The specific name was chosen to honor the Russian entomologist V.I. Belizin, whose work unveiled much of the current knowledge of the Asian Anacharitinae.

### Material examined

#### Holotype

THAILAND: ♀, with the following labels: “THAILAND, Doi Inthanon Nat. Park, MT, 6-12.VI.1990: B.V. Brown leg” (white label); “*Anacharis belizini* Mata-Casanova & Pujade-Villar sp. nov., desig. Mata-Casanova 2014” (white label); “HOLOTYPE ♀, *Anacharis belizini* Mata-Casanova & Pujade-Villar sp. nov., design Mata-Casanova-2014” (red label) (CNC).

### Type locality

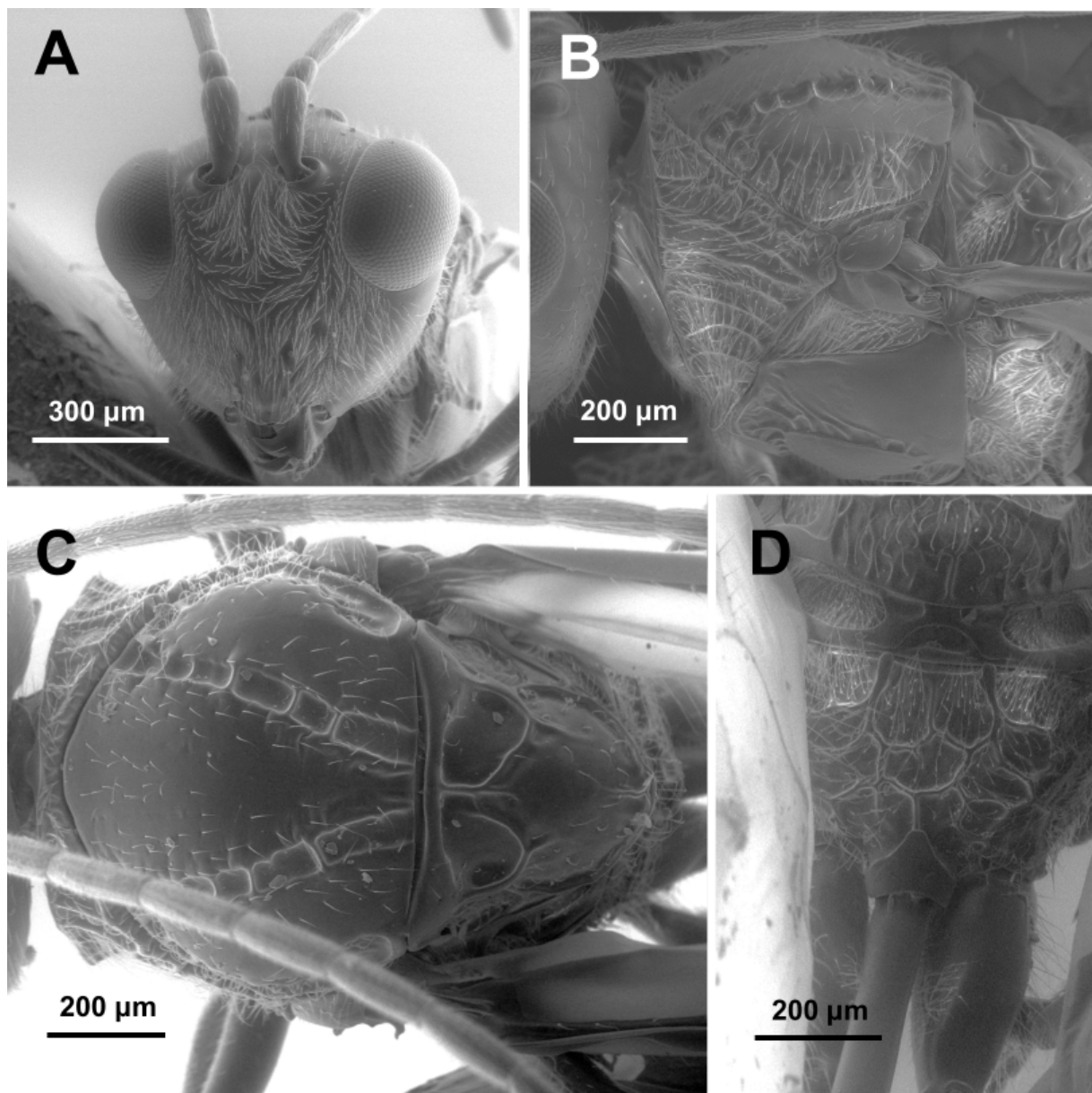
THAILAND: Doi Inthanon Nat. Park, Chiang Mai Province.

### Description

LENGTH. Body: 3 mm. Antennae: 2.3 mm (♀). Wings: 2.5 mm.

COLORATION. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown with darker first segment. Legs yellowish brown with darker coxae, third coxa black. Veins of wings brownish.

HEAD. Triangular-shaped in anterior view. Face smooth, covered with abundant white setae (Fig. 3A). Width of head 1.3 times its height in front view and 1.8 times its length in dorsal view. Malar sulcus coriaceous, 0.8 times height of compound eye. Transfacial line length equal to compound eye height.



**Fig. 3.** *Anacharis belizini* sp. nov. **A.** Head in front view. **B.** Mesosoma in lateral view. **C.** Mesosoma in dorsal view. **D.** Propodeum.



Diameter of the toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus shortly defined, convex, densely covered by pubescence. Occipital and postocular carinae absent. Compound eyes glabrous. In females, POL:OOL:LOL ratio = 7.5:5:3, being ocelli diameter 2.5 in females. Frons, gena and occiput smooth and densely pubescent.

ANTENNAE. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(3), 2(3), 11(2), 9(2), 8(2), 8(2), 7(2), 7(2), 6.5(2), 6(2), 6(2), 5.5(2), 10(2). Placodeal sensilla starting at F1.

MESOSOMA. Pronotal plate coriaceous. Pronotum pubescent, alutaceous, most of surface covered with parallel oblique ridges (Fig. 3B). Mesoscutal width 1.2 times its length in dorsal view. Mesoscutum smooth, shiny, almost glabrous except for few short lateral setae; weak carinate sculpture at edges of notauli (Fig. 3C). Notauli complete with variable transverse carinate sculpture; median mesoscutal furrow short but distinct. Parapsidal signum absent; parascutal sulcus present, internally carinate. Scutellar length 0.8 times that of mesoscutum length in dorsal view. Scutellum smooth, shiny, not areolate (Fig. 3D). Scutellar foveae rounded, smooth, without any internal carinae, basally defined by a carina; lateral pits of scutellar foveae present. Interfoveal line present. Short median scutellar carinae present at scutellum apex. Circumscutellar carina complete, clearly defined, not dorsally projected at scutellar apex. Mesopleuron glabrous, shiny, with internally carinate transverse groove; presence of weak carinae in anterior mesopleuron. Mesopleural triangle smooth, glabrous. Metanotal troughs densely pubescent. Propodeum alutaceous, pubescent; central area with large superior cell symmetrically divided into two areas by a transverse carina, upper area being internally divided by median longitudinal carina while lower one not; rest of propodeum divided in few large cells (Fig. 3D).

WINGS. Pubescent. Radial cell of forewing closed, 2.8 times as long as wide. Marginal pubescence of forewing denser at the apical third.

METASOMA. Longer than head + mesosoma. Petiole about 2.0 times as long as metacoxa, smooth and shiny. Third metanotal tergum 1.5 times as long as fourth tergum in dorsal view. Fifth, sixth, seventh metanotal terga visible in dorsal view. Metanotal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

### Biology

Unknown.

### Distribution

Indomalayan. Known only from Thailand.

*Anacharis fergussoni* Mata-Casanova & Pujade-Villar sp. nov.  
[urn:lsid:zoobank.org:act:1618E860-8EC0-4979-A78A-24E87F1D0A64](https://zoobank.org/act:1618E860-8EC0-4979-A78A-24E87F1D0A64)

Fig. 4A–C

### Diagnosis

Species very similar to *A. parapsidalis*, from which can be distinguished by having smooth pronotum with only some short carinae in its lower region (pronotum strongly carinate in all its surface in *A. parapsidalis*). It is also very similar to the Nearctic species *A. melanoneura*, except for having alutaceous and more strongly areolate scutellum, a complete median carina in the propodeum and placodeal sensilla starting at F1 (in *A. melanoneura*, the scutellum is smooth and not so strongly areolate, the median propodeal carina is incomplete and placodeal sensilla start at F2).

### Etymology

The specific name was chosen to honor the British entomologist N. Fergusson, who systematized the confusing information on European Anacharitinae.

### Type material

#### Holotype

GERMANY: ♀, with the following labels: “GERMANY, Ingelheim Rhein, MT, 1-30.IX.1968: I. Sreffan Orchard leg” (white label); “*Anacharis fergussoni* Mata-Casanova & Pujade-Villar sp. nov., desig. Mata-Casanova 2014” (white label); “HOLOTYPE ♀, *Anacharis fergussoni* Mata-Casanova & Pujade-Villar sp. nov., design Mata-Casanova-2014” (red label) (CNC).

#### Paratypes

(22 ♀♀ & 17 ♂♂: 5 ♀♀ deposited in CNC; 17 ♀♀ & 17 ♂♂ deposited in UB)

SPAIN: 1 ♂, Teruel, Mora de Rubielos, 28 Aug. 1965, I. Docavo Alberti leg.; 1 ♀, Valencia, Sot de Chera, 3 Aug. 1988, J. Pujade leg. (UB).

ANDORRA: 4 ♀♀, Santa Coloma, MT, Aug. 1992, J. Pujade leg. (UB); 2 ♀♀, Santa Coloma, MT, Sep. 1992, J. Pujade leg. (UB); 1 ♀, Santa Coloma, MT, Sep. 1992, J. Pujade leg. (UB); 1 ♀, Santa Coloma, MT, 16–30 Apr. 1993, J. Pujade leg. (UB); 1 ♀, Santa Coloma, MT, 1–15 Jul. 1993, J. Pujade leg. (UB).

FRANCE: 1 ♀, Alpes-de-Haute-Provence, Parc Nat. Mercantour, Uvernet-Fours, Bois de la Tellière, 44°19' N 6°37' E, 1407 m a.s.l., 20 Jul. 2011, Takuma Yoshida leg. (UB).

GERMANY: 1 ♀, Mainz, 26 Aug.–3 Sep. 1965, A.W. Steffan leg. (CNC); 1 ♀, Gelnhausen in Hessen Deutschland, MT, Sep. 1967, L. Masner leg. (CNC); 1 ♀, Ingelheim Rhein, MT, 1–30 Sep. 1968, I. Sreffan Orchard leg. (CNC).

SLOVAKIA: 2 ♀♀, Cachtice env., 11 Aug. 1991, L. Masner leg. (CNC).

HUNGARY: 1 ♂, Kalocsa, 25 Apr. 1939, Erdős leg. (UB); 3 ♂♂, Vas m. Cák, 4 Jul. 1994, G. Melika leg. (UB); 8 ♂♂, Vas m. Celdömölk, 5 Jul. 1994, Melika G. leg. (UB); 4 ♀♀, 1 ♂, Vas m. Cák, 8 Jul. 1994, Kótenko A. leg. (UB); 1 ♀, 1 ♂, Vas Co., Hörmann forr., 20 Jul. 1996, Cs. Thuróczy leg. (UB); 1 ♂, Veszprém Co., Bakonygyepes, 2 Jul. 2000, Zóltan Acs leg. (UB).

ROMANIA: 1 ♀, Harghita Co., Kiruly Valley, 10 Aug. 2000, Zóltan Acs leg. (UB).

NORWAY: 1 ♂, Oppdal, Kongsvoll, Raubekken, 900 m a.s.l., MT, 14 Aug. 1980, J.O. Solem. 1 ♀, Alta, Detsika, Buolamalia, MT, 24 Jun.–16 Jul. 1996, Lars Ove Hansen leg. (UB).

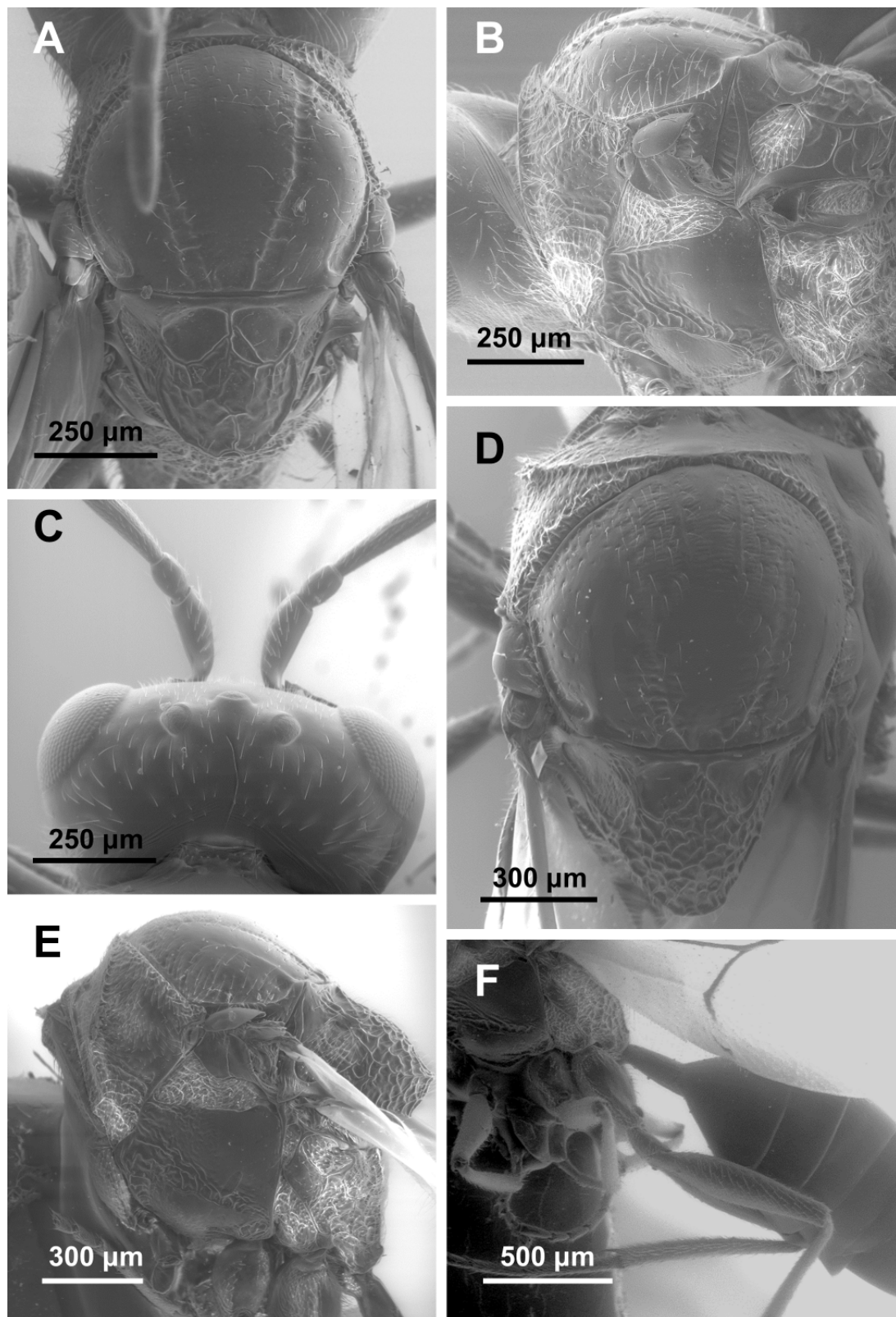
### Type locality

GERMANY: Ingelheim am Rhein, Rhineland-Palatinate.

### Description

LENGTH. Body: 2.9 mm. Antennae: 2.3 mm (♀), 2.5 mm (♂). Wings: 2.8 mm.

COLORATION. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown with black first segment. Legs yellowish brown, upper femur and coxae darker. Veins of wings brownish.



**Fig. 4.** *Anacharis fergussoni* sp. nov. **A.** Mesosoma in dorsal view. **B.** Mesosoma in lateral view. **C.** Head in dorsal view. – *Anacharis norvegica* sp. nov. **D.** Mesosoma in dorsal view. **E.** Mesosoma in lateral view. **F.** Petiole.

**HEAD.** Triangular-shaped in anterior view. Face smooth, covered with abundant white setae. Width of head 1.3 times its height in anterior view and 2.4 times its length in dorsal view. Malar sulcus coriaceous, 0.7 times height of compound eye. Transfacial line length 1.1 times height of compound eye. Diameter of the toruli shorter than inter-toruli distance, but bigger than torulus to compound eye distance. Clypeus shortly defined, convex, densely covered by facial pubescence. Occipital and postocular carinae absent. Compound eyes glabrous. In both sexes POL:OOL:LOL ratio = 7:5:3, ocelli diameter being 3. Frons and occiput smooth covered by some scarce hyaline hairs, gena densely pubescent.

**ANTENNAE.** Cylindrical flagellomeres covered with pubescence. Female antennal formula: 8(3), 3(2.5), 11(2), 9(2), 8(2), 8(2), 8(2), 7.5(2), 6.5(2), 6.5(2), 6(2), 5.5(2), 9.5(2). Male antennal formula: 9(3), 3.5(3), 10.5(2.5), 9(2.5), 9(2.5), 8(2), 8(2), 7.5(2), 7.5(2), 7(2), 7(2), 7(2), 6(2), 7(2). Placodeal sensilla starting at F1 in both sexes (Fig. 4C).

**MESOSOMA.** Pronotum alutaceous, densely pubescent, slightly coarse in most of its surface, presence of some short carinae in its ventral region (Fig. 4B). Mesoscutal width 1.2 times its length in dorsal view. Mesoscutum smooth, shiny, almost glabrous except for a few lateral short setae; weak alutaceous sculpture at base of notauli (Fig. 4A). Notauli complete with strong transverse carinae; median mesoscutal furrow short but distinct. Parapsidal signum short; parascutal sulcus present, internally carinate, being more distinct in anterior mesoscutum (Fig. 4B). Scutellar length 0.6 times that of mesoscutum in dorsal view. Scutellum alutaceous, shiny, completely areolate (Fig. 4A). Scutellar foveae rounded, smooth, without any internal carinae, basally defined by a carina; lateral pits of scutellar foveae present but superficial. Interfoveal line present. Circumscutellar carina complete, clearly defined, not dorsally projected at scutellum apex. Mesopleuron glabrous, shiny, with internally carinate transverse groove, presence of more or less extended coarse sculpture in anterior mesopleuron which may not be present in some cases. Mesopleural triangle densely covered by long hyaline hairs. Metanotal troughs densely pubescent. Propodeum heavily alutaceous, pubescent; central area longitudinally divided in two symmetrical areas by median carina; both areas are further divided by short transverse carinae in one big upper cell and two smaller cells.

**WINGS.** Pubescent. Radial cell of forewing closed, 2.7 times as long as wide. Marginal pubescence of forewing denser at apical third.

**METASOMA.** Longer than head + mesosoma. Petiole about 2.0 times as long as metacoxa, smooth and shiny. Third metanotal tergum 2.1 times as long as fourth tergum in dorsal view. Fifth, sixth, seventh metanotal terga visible in dorsal view. Metanotal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

### **Taxonomic remarks**

After examining large series of material, we have concluded that although most Anacharitinae species show a substantial degree of intraspecific variability in their body sculpture, the difference regarding the pronotal sculpture between *Anacharis fergussoni* sp. nov. and *A. parapsidalis* is greater than the variation among the individuals of each species, thus supporting *A. fergussoni* sp. nov. as a new species.

### **Biology**

Unknown.

### **Distribution**

Palearctic. Collected from Spain, Andorra, France, Germany, Slovakia, Hungary, Romania and Norway.

*Anacharis norvegica* Mata-Casanova & Pujade-Villar sp. nov.  
[urn:lsid:zoobank.org:act:08CD1A71-B8FA-4015-BCD4-D68C09C288B8](https://zoobank.org/act:08CD1A71-B8FA-4015-BCD4-D68C09C288B8)

Fig. 4D–F

### Diagnosis

Species with incomplete notauli like *A. immunis*, from which can be distinguished by having a median mesoscutal furrow, a carinate sculpture in anterior mesoscutum and a strongly areolate scutellum (median mesoscutal furrow absent, mesoscutum completely smooth and scutellum smooth to tenuously areolate in *A. immunis*). This species is also morphologically similar to *A. eucharoides*, however it can be easily distinguished by the strongly areolate scutellum (scutellum alutaceous to rugose, never areolate, in *A. eucharoides*).

### Etymology

The specific name makes reference to the distribution area of the type series.

### Type material

#### Holotype

NORWAY: ♀, with the following labels: “NORWAY, Oppdal, Kongsvoll, Raubekken, 900 m, MT, 21.VIII.1980: J. O. Solem leg” (white label); “Holotype of *Anacharis norvegica* Mata-Casanova & Pujade-Villar sp. nov., desig. Mata-Casanova 2014” (red label); “HOLOTYPE ♀, *Anacharis norvegica* Mata-Casanova & Pujade-Villar sp. nov., design Mata-Casanova-2014” (red label) (UB).

#### Paratypes

NORWAY: 1 ♀, Oppdal, Kongsvoll, Raubekken, 900 m a.s.l., MT, 7 Aug. 1980, J.O. Solem leg.; 2 ♀♀, Oppdal, Kongsvoll, Gavalibk, MT, 13 Jul. 1982, J.O. Solem leg.; 1 ♀, Oppdal, Kongsvoll, Raubekken, 900 m a.s.l., MT, 31 Jul. 1982, J.O. Solem leg.; 1 ♀, Oppdal, Kongsvoll, Gavalibk, MT, 3 Aug. 1982, J.O. Solem leg.; 2 ♀♀, Oppdal, Kongsvoll, Raubekken, 900 m a.s.l., MT, 14 Aug. 1980, J.O. Solem leg. (all in UB).

### Type locality

NORWAY: Oppdal, Trøndelag.

### Description

LENGTH. Body: 3.5 mm. Antennae: 3 mm (♀). Wings: 3.3 mm.

COLORATION. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown with black first segment. Legs yellowish brown, upper femur and coxae darker. Veins of wings brownish.

HEAD. Triangular-shaped in anterior view. Face smooth, covered with abundant white setae. Width of head 1.2 times its height in anterior view and 1.9 times its length in dorsal view. Malar sulcus coriaceous, 0.6 times height of compound eye. Transfacial line as long as compound eye height. Diameter of toruli equal to torulus to compound eye distance but larger inter-toruli distance. Clypeus shortly defined, convex, margins densely covered by facial pubescence. Occipital and postocular carinae absent. Compound eyes glabrous. In females, POL:OOL:LOL ratio = 7:4.5:3, ocelli diameter being 2.5. Frons and occiput smooth covered by some scarce hyaline hairs, gena densely pubescent.

ANTENNAE. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(5), 3.5(3), 9(2), 8.5(2), 8.5(2), 8(2.5), 8.5(2.5), 8(3), 7(3), 6.5(3), 6(3), 6(3), 11(3). Placodeal sensilla start at F4 but not abundant until F5 in females.

MESOSOMA. Pronotum smooth, punctate, with shortly extended ridges from pronotal plate margin that become transverse carinae in ventral pronotum (Fig. 4E). Mesoscutal width 1.1 times its length in dorsal view. Mesoscutum smooth, shiny, almost glabrous except for a few short setae; weak carinate sculpture in region between notauli more distinct in anterior mesoscutum (Fig. 4D). Lateral region of mesoscutum smooth and glabrous, except for some peripheral short setae and punctures. Notauli weakly impressed, effaced in anterior mesoscutum, presence of weak internal carinate sculpture (Fig. 4D); median mesoscutal furrow short but distinct. Parapsidal signum tenuous, parascutal sulcus absent. Scutellar length 0.6 times that of mesoscutum in dorsal view. Scutellum alutaceous, shiny, completely covered by small areolate sculpture (Fig. 4D). Scutellar foveae triangular, smooth, without any internal carinae, basally defined by a carina; lateral pits of scutellar foveae elongated and deeply excavated. Interfoveal line present. Circumscutellar carina complete, clearly defined, not dorsally projected at scutellum apex. Mesopleuron glabrous, shiny, with internally carinate transverse groove alutaceous, presence of coarse sculpture in anterior mesopleuron. Mesopleural triangle densely covered by long hyaline hairs. Metanotal troughs coarse, densely pubescent. Propodeum coriaceous, pubescent; central area longitudinally divided in two symmetrical areas by a median carina; both areas are further divided by short transverse carinae.

WINGS. Pubescent. Radial cell of forewing closed, 3 times longer than wide. Marginal pubescence of the forewing denser at apical third.

METASOMA. Longer than head + mesosoma. Petiole about as long as metacoxa (Fig. 4F), smooth and shiny. Third metanotal tergum 2.9 times as long as fourth tergum in dorsal view. Fifth, sixth and seventh metanotal terga visible in dorsal view. Metanotal terga smooth and glabrous, never punctate.

### **Biology**

Unknown.

### **Distribution**

Palearctic. Only collected from Norway.

Genus *Aegilips* Haliday, 1835

*Aegilips flavidicornis* (Kieffer, 1910) comb. nov.

*Anacharis flavidicornis* Kieffer, 1910: 335. Type examined.

*Anacharis flavidicornis* Kieffer, 1911: 121. New name from *Anacharis flavidicornis* Kieffer, 1910 (non *Anacharis flavidicornis* Kieffer, 1909).

### **Material examined**

Type material of *Anacharis flavidicornis*. Holotype ♂: “Chinese Turkestan, Kora-Ssu b. Polu, 2115 m, 6.6.90, Conradt S.” (white label); “Type” (red label); “A. flavidicornis” (white label); “Zool. Mus. Berlin” (white label); “*Aegilips flavidicornis* ♂ (Kieffer, 1910), N. Mata-Casanova det, 2014” (white label) (ZMB).

### Taxonomic remarks

After examining the holotype, we found it has characters that fit within the genus *Aegilips* rather than *Anacharis*: petiole shorter than the metacoxa and coarsely sculptured, mesopleuron anteriorly carinated and without transverse mesopleural groove. For this reason we here recombine this species as *Aegilips flavidicornis* (Kieffer, 1910) comb. nov.

### Discussion

After relocating *Anacharis flavidicornis* to *Aegilips*, the synonymization of *A. gracilipes* with *A. eucharoides* and the description of *A. belizini* sp. nov., *A. fergussoni* sp. nov. and *A. norvegica* sp. nov., seven species of *Anacharis* are present in the Palaearctic and Indomalayan regions: *Anacharis antennata*, *A. belizini* sp. nov., *A. eucharoides*, *A. fergussoni* sp. nov., *A. immunis*, *A. norvegica* sp. nov. and *A. parapsidalis*. The number of valid species of *Anacharis* rises to twenty-two.

For the Eastern Palaearctic species *Anacharis antennata* and *A. parapsidalis* are cited for the first time from Japan. *Anacharis antennata* maintains its known distribution area restricted to the northeastern Asian continent, from Japan to Khabarovskiy krai in Russia. In the case of *A. parapsidalis*, previously known from Tajikistan in Central Asia only, the presence of specimens in Japan and one specimen from Romania suggests a wide distribution area across the Palaearctic region.

*Anacharis eucharoides* was mostly circumscribed to the Western portion of the Palaearctic region, with only one exemplar collected on the Asian continent (Belizin 1961); its known European distribution area previously comprised mostly Central and Eastern Europe. The new data presented in this work expands its known distribution to southern Europe and northwest Africa, with one specimen collected in Morocco. The current knowledge of the species distribution patterns suggests a Palaearctic distribution area centered in Central and Eastern Europe.

The known distribution of *Anacharis immunis* was divided between two areas before our study: one ranging from western Europe to the Caucasus while the other was limited to the Russian Far East. The presence of *A. immunis* in Europe has now been consolidated with the addition of new citations from central Europe and the first specimens collected in southern Europe. The Asian distribution of the species is documented by two specimens only, both of them still limited to the Easternmost regions of Asia. This distribution pattern, divided into two areas, suggests a very plausible presence of the species across the whole Palaearctic region, but more specimens from Asia will need to be collected in the future to support this hypothesis.

Regarding the distribution of the newly described species, *Anacharis fergussoni* sp. nov. has been found in southern and central Europe, while the distribution of *A. norvegica* sp. nov. is restricted to southern Norway. More interesting is the description of *A. belizini* sp. nov., the first species of *Anacharis* for the Indomalayan region, where the Anacharitinae record was previously limited to two species of *Xyalaspis* cited from Thailand (Mata-Casanova *et al.* 2014b). The new data on *A. belizini* sp. nov. makes the genus present in all regions and extends the knowledge of the anacharitines in the region. However, the Indomalayan anacharitines are still far from being well known. More research should be done in order to improve our knowledge of the Indomalayan anacharitines.

Unlike *Xyalaspis*, which presents high interspecific variability in mesoscutal sculpture (Mata-Casanova *et al.* 2014a, 2014b), the variability in the sculpture of the mesoscutum in *Anacharis* is reduced to some weak carinae in some species. Regarding their mesoscutal traits, species of *Anacharis* could be roughly divided between those species with complete and deeply excavated notauli usually internally carinate and those with incomplete notauli or so weakly excavated that they appear to be incomplete. In the case



of Eurasian species, all species fall in the first category, except for *A. immunis* and *A. norvegica* sp. nov., which have tenuous notauli effaced in anterior mesoscutum (Figs 3C, 4D).

More useful characters to distinguish between species of *Anacharis* are those related to the pronotum and the scutellum. When talking about the pronotum, most species of the genus have a smooth surface with only some short lower carinae; this is the case of *A. antennata* (Fig. 1B), *A. eucharoides* (Fig. 2D), *A. immunis* (Fig. 2E) –in which carinae are very reduced– and *A. norvegica* sp. nov. (Fig. 4E). *Anacharis fergussoni* sp. nov. represents the next step in pronotal sculpture, having a more extended lower carina, while the rest of the pronotum is slightly coarse (Fig. 4b). *Anacharis parapsidalis* (Fig. 1D) and *A. belizini* sp. nov. (Fig. 2B) represent the other side of the spectrum with a completely carinated pronotum.

Regarding the scutellar sculpture, the studied species of *Anacharis* have a high degree of interspecific variability: *Anacharis antennata* and *A. belizini* sp. nov. have a smooth and shiny scutellum with no traces of carinae (Figs 1A and 2C, respectively); both species also present a short median scutellar carina at the apex of the scutellum, which can be interpreted as the remains of a more developed scutellar sculpture. The next degree in scutellar sculpture is seen in *A. eucharoides*, which has an alutaceous scutellar surface and shows traces of areolate sculpture near the circumscutellar carina (Fig. 2A–B). *Anacharis immunis* has a high degree of variability in scutellar sculpture, ranging from an almost smooth scutellum in some individuals (Fig. 2C) to having areolate sculpture in others (Fig. 2E–F), but their carinae are not as strong as in *A. norvegica* sp. nov., *A. parapsidalis* or *A. fergussoni* sp. nov. in which the surface is completely covered by strong areolated sculpture (Figs 4D, 1C and 2C, respectively). The sculpture in the mesoscutum, however, is not constant: while *A. parapsidalis* and *A. fergussoni* sp. nov. have large cells across scutellar surface (Figs 1C, 2C), the scutellum in *A. norvegica* sp. nov. is divided into small cells (Fig. 4D).

The Palaearctic is the region where more hosts have been recorded for *Anacharis*, all of them belonging to subfamily Hemerobiidae (Neuroptera): Kierych (1984) listed *Wesmaelius subnebulosus* and *Wesmaelius nervosus* as hosts of *Anacharis immunis*; later, Fergusson (1986) listed *Hemerobius micans*, *Wesmaelius betulinus* and *Wesmaelius subnebulosus* as hosts of *Anacharis eucharoides*. There are 170 species of Hemerobiidae cited for the Palaearctic region (Makarkin 1995), so the species of *Anacharis* studied have plenty of potential hosts. More research should be done in order to unveil the life cycle of Eurasian *Anacharis*.

## Acknowledgments

Thanks to John Huber and Jennifer Read (CNC), Claire Villemant and Magdalena Czyrnek (MNHN) and Pierre-Nicolas Libert (ULg) for the loan of the undetermined material on which this study is based. To David G. Notton (NHM) for the loan of the lectotypes of *A. eucharoides* and *A. immunis* along with undetermined specimens, to Melanya Stan (MGAB) for the loan of the type material of *A. gracilipes*, to Frank Koch (ZMB) for the loan of *A. flavidicornis* type material, to Christer Hansson (LU) for the loan of *A. eucharoides* additional material and Oleg Kovalev (ZIN) for the information about the status of the type material of *A. antennata* and *A. parapsidalis*. To Miguel Ángel Alonso Zarazaga (MNCN) for his help and counsel on nomenclatural issues. This study was funded by the project CGL2011-22889 of the “Ministerio de Ciencia e Innovación” of Spain and the grant BES-2012-060797 of the “Ministerio de Economía” of Spain.

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*Manuscript received: 4 August 2016*

*Manuscript accepted: 5 July 2017*

*Published on: 15 March 2018*

*Topic editor: Koen Martens*

*Desk editor: Pepe Fernández*

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