

Contribution to the knowledge of the genus *Halter* (Neuroptera: Nemopteridae)

LEVENTE ÁBRAHÁM

Rippl-Rónai Museum, Kaposvár
H-7400 Kaposvár, P.O. Box 70, Hungary,
e-mail: labraham@smmi.hu

ÁBRAHÁM, L.: *Contribution to the knowledge of the genus Halter (Neuroptera: Nemopteridae)*.

Abstract: This paper summarizes all information on the genus *Halter* living in South Western Palearctic and West Oriental regions. The type and non type materials are preserved in different collections, they were re-identified and seven taxa were checked. *Halter halteratus* (Forskål, 1775) is a widespread species in North Africa and South West Asia. *Halter libratus* Navás, 1910 (syn. n.) from Sudan is a new junior synonym of *Halter halteratus* (Forskål, 1775). *Halter nutans* Navás, 1910 spreads only in South West Asia. The type specimen of *Halter albostigma* (Westwood, 1874) was mislabelled since all species of the genus are known only from the South Western Palearctic to the West Oriental area. Recently, *Halter albostigma* (Westwood, 1874) was recorded in South East Pakistan. The examined material agrees well morphologically with the type specimen. The type specimen of *Eretmoptera neglecta* Navás, 1910 has been recently found and checked. It also proved to be a synonym of *Barbibucca biremis* (Kolbe, 1900) and the type came from South Africa not from Oriental as it was considered before. *Nemopistha sinica* C.-k. Yang, 1986 from South China is a valid species but generic revision is needed in the future. With 25 figures.

Keywords: Nemoptera, Halter, new synonym, type specimen

Introduction

The species of Nemopteridae Burmeister, 1839 are very attractive insects, their hindwings are strongly elongated, head and mouth parts are specialized in pollen consumption. Their larvae show high morphological similarity and lifestyle to the larvae of antlions and owl-flies.

About 150 species were described in two subfamilies (Crocinae Navás, 1910, Nemopterinae Burmeister, 1839) all around the world (OSWALD 2007).

The highest number of species (49 sp.) in the subfamily of Nemopterinae is known in South Africa (TJEDER 1967), compared to the West Palearctic region where only 24 species can be found (HÖLZEL 1999, ASPÖCK et al. 2001).

Based on the daily activities, these species can be classified into two groups. The yellow and dark species of the genus, *Nemoptera* Latreille, 1802 are active only in daytime. The colourless transparent forewing species of genera *Lertha* Navás, 1910, *Halter* Rambur, 1842, *Brevistoma* Tjeder, 1967 and *Savignyella* Kirby, 1900 are active mainly at night and attracted by light, but pollen feeding behaviour can be also observed during daytime.

According to TJEDER (1967), HÖLZEL (1999), ASPÖCK et al. (2001, 2006), we need to revise the Palearctic genera: *Brevistoma* Tjeder, 1967, *Halter* Rambur, 1842, *Kyrbinia* Navás, 1910, *Lertha* Navás, 1910, *Olivierina* Navás, 1910 and *Savignyella* Kirby, 1900.

In South Western Palearctic, three valid *Halter* species are known (HÖLZEL 1999).

Halter halteratus (Forskål, 1775) described from Yemen is a widespread species all over the Saharan Africa and partly in the Arabian Peninsula. It is considered to be a Polycentric afro-syroeremial faunal element (ASPÖCK et al. 2001).

According to HÖLZEL (1999) *Halter libratus* Navás, 1910 is probably a synonym of *Halter halteratus* (Forskål, 1775) since the distribution of the two taxa overlaps in the part of Saharan Africa and the only type specimen is known from Sudan.

ASPÖCK et al. (2001) listed two valid *Halter* species, *Halter halteratus* (Forskål, 1775) and *Halter nutans* Navás, 1910 in the Western Palearctic but their distributions remained unclear (HÖLZEL 1968, 1999, MEINANDER 1980) till recently. *Halter nutans* described from Pakistan is an Irano-eremial faunal element (ASPÖCK et al. 2001).

The fourth species, *Halter albostigma* (Westwood, 1874) is a hidden species since only the type specimen has been known from South Africa till now. According to TJEDER (1967) the type locality doubtful because the distribution area of all *Halter* species restricted to the Northern Hemisphere.

Further retarding factor in the separation of these species is the lack of significant difference in their genitalia structures (TJEDER 1970, HÖLZEL 1999).

Our limited knowledge on their distribution and also the genera of subfamily of Nemopterinae need of revision (HÖLZEL 1999). In addition, *Nemopistha sinica* C.-k. Yang, 1986 described from China belonging to Nemopterinae can not be congeneric with any African genera.

Material and methods

After receiving some *Halter* specimens from Pakistan for identification, I realized that these specimens were not conspecific with any well-known Palearctic species, namely *Halter halteratus* and *H. nutans* either. Studying the literature, I found several unsolved nomenclature and taxonomic problems which had to be checked in the collections where the type specimens preserved and had to check the non type material as well.

Good resolution photos of type material were collected from the following museums: Museum National d'Histoire Naturelle, Paris, France; the Natural History Museum, London, UK; Hope-Westwood Entomological Collections, Oxford University, UK. All non type specimens preserved in the entomological collection of Rippl-Rónai Museum (Kaposvár) were reidentified and compared to the photos of the type specimens. The morphological examinations were completed with the help of the non type material.

Results and discussion

Abbreviations: Chlist – Checklist, Comb – New combination, Dist – Distribution, Fig – Figure, K – Key with comment, Misid – Misidentification, Mon – Monograph, Morph – Morphology, Odescr – Original description, Syn – Synonym, Tdesign – Type designation, Tcom – Type comment
FW - Forewing, HW - Hindwing, C - Costa, Sc - Subcosta, R - Radius, M - Media, Rs - Radius sector, CuA - Cubitus anterior, CuP - Cubitus posterior

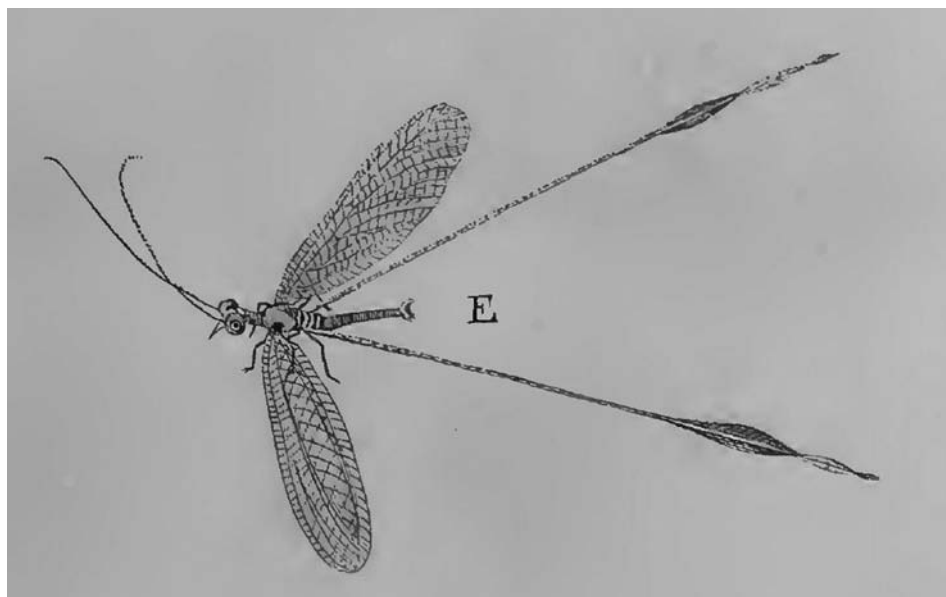


Fig. 1: *Panorpa halterata*, the original figure published by FORSKÅL & CARSTEN (1776) and OLIVIER (1797) as "*Le Panorpe d'Orient*"

Halter Rambur, 1842

Type species: Panorpa halterata Forskål, 1775 - ASPÖCK et al. 2001 (Tdesign)

Nemoptera alba Olivier, 1811 - DESMAREST in D'ORBIGNY 1849 (Tdesign), KIRBY 1900 (Tcom)

Nemoptera pallida Olivier, 1811 - KIRBY 1900 (Tdesign)

Medium sized. Rostrum produced into a beak. Pronotum trapezoid shaped, relatively short. Forewing transparent, subcostal area hyaline to yellow. Pterostigma small and distinct. Rs originates at middle or beyond of wing. CuA slightly arched, CuA and CuP united near base. Hindwing at least twice longer than forewing. Hindwing with only simple dilation. Sexual dimorphism present. Female usually larger than male. Male antenna longer than that of female, hindwing dilation wider on female than that of male. Abdomen slender. Male ectoproct oval with distal hairs. Sternite 9 slipper-like shaped with disto-lateral lobes and with medium long hairs. Gonarcus has wide arch with a pair of prominent latero-dorsal processes. Gonolatus membranous with two groups of long gonosetae and several shorter hairs. Mediuncus present. Parameres with long bent apex. (Figs. 20-23). Female ectoproct oval with distal hairs. Lateral gonapophyses slightly oval with short hairs. A sclerotized brush-like structure on each side below ectoproct. (Figs. 18-19). The function of this structure is unknown. Spermatheca elongate slightly chitinised.

Remarks: The type of the genus was designated by DESMAREST in D'ORBIGNY [1846] (1949) as *Nemoptera alba* Olivier, 1811 but it did not belong to Nemopterinae. Later, KIRBY (1900) designated *Nemoptera pallida* Olivier, 1811 as generic type species based on RAMBUR's (1842) description. OSWALD & PENNY (1991) mentioned *Nemoptera alba* Olivier, 1811 as generotype again. Finally, ASPÖCK et al. (2001) called our attention to the incorrect type designation.

Halter halteratus (Forskål, 1775)

Type: Beit el Fakih, (Bayt-el-Faqih, Yemen) - type deposition unknown.

Panorpa halterata Forskål, 1775 - FORSKÅL 1775 (Odescr), FORSKÅL & CARSTEN 1776 (Fig), FABRICIUS 1781 (Morph, Misid), 1787 (Morph, Misid), 1798 (Dist, Misid), GMELIN 1788 (Morph, Misid), OLIVIER 1797 (Fig, as "Le Panorpe d'Orient") (Fig. 1)

Nemoptera halterata (Forskål, 1775) - OLIVIER 1811 (Comb, Dist, Misid), LAMARCK 1817 (List), WALKER 1853 (Mon), SÉLYS-LONGCHAMPS 1866 (Fig)

Nemoptera pallida Olivier, 1811 - OLIVIER 1811 (Odescr), KLUG 1836 (Syn), RAMBUR 1842 (Morph, Dist, Fig), NAVÁS 1910 (Syn)

Nematoptera pallida (Olivier, 1811) - WESTWOOD 1841 (Comb)

Nematoptera forskalli Westwood, 1841 - WESTWOOD 1841 (Odescr), HAGEN 1866 (Syn), NAVÁS 1910 (Syn)

Halter halterata (Forskål, 1775) - KIRBY 1900 (Comb, Dist), NEEDHAM 1909 (Dist, Misid)

Halter halteratus (Forskål, 1775) - NAVÁS 1910 (K, Dist), 1913a (Dist), 1913b (Dist), 1926 (Dist), 1927 (Dist), ESBEN-PETERSEN 1918 (Dist), MORTON 1921 (Dist, Misid?), AUBER 1955 (Dist), GHOSH 1977 (Dist, Misid), GHOSH & SEN 1977 (Dist, Misid), MEINANDER 1980 (Dist, Misid), MONSERRAT et al. 1990 (Dist), 2008 (Dist), ASPÖCK & HÖLZEL 1996 (Dist), HÖLZEL 1998 (Dist), 1999 (Dist), ASPÖCK et al. 2001 (Dist), Chandra and Sharma (?) (Dist, Misid)

Halter libratus Navás, 1910 - NAVÁS 1910 (Odescr), 1912a (Dist), 1912c (Dist, K), HÖLZEL 1999 (Com), *syn. n.*

Material examined:

The type specimen of *Nemoptera pallida* Olivier, 1811 preserved in MNHP - Museum National d'Histoire Naturelle, Paris, France.

The type label information: white label with red letters: // Type //; white label: // Museum Paris / Bagdad / 15 l. N-O / Olivier // [with unknown handwriting], white label: // pallida Ol[ivier] / [with Olivier's handwriting] / halterata Forskael // [with unknown handwriting]; white label in squared paper: // Halter / halteratus ♀ / Forsk. // [with Navás's handwriting]; white label: // Halter / halteratus / Forsk [with unknown handwriting] Login Navás det. 1910. // (Fig. 2)

Type condition: average, antenna missing, costal area of forewing torn and glued, end of left hindwing broken.

The type specimen of *Halter libratus* Navás, 1910 preserved in BMNH - The Natural History Museum, London, UK.

The type label information: round white label with red edge: // Type //; white label: // BMNH(E) 1201791 //; white label: // Khartoum / S. S. Flower. / 1905 27 4 //; white label in squared paper: // Halter / libratus ♀ / Type. Nav.[ás] // [with Navás's handwriting]; white label / H. u. U. Aspöck vid. 1981 / (Fig. 3)

Type condition: good, antenna missing, abdomen broken preserved in a genital vial.

Additional non types: Morocco 6 km Ait Saoun 1606m N30°42'22.5";W06°35'59.0" 06.25.2008 Leg: Ábrahám L., Bognár L., Nagy L. 1♀; Morocco 5 km from Tissint 647m N29°52'20.0";W07°16'45.8" 07.05.2008. Leg: Ábrahám L., Fábrián, Gy., Rozner, Gy. 4♂ 4♀; Morocco 5 km from Tissint 647m N29°52'20.0";W07°16'45.8" 12.06.2010. Leg: Ábrahám L., Kisbenedek T., Wágner L. 1♀; Morocco 13 km SW from Agdz 1050m N30°39'11.6"; W06°33'51.2" 16.06.2010. Leg: Ábrahám L., Kisbenedek T., Wágner L. 3♂ 1♀; Morocco 13km SW from Agdz 1050m N30°39'11.6";W06°33'51.2" 13.06.2010. Leg: Ábrahám L., Kisbenedek T., Wágner L. 1♂ 1♀. Deposited in the entomological collection of Rippl-Rónai Museum Kaposvár (Hungary).

Remarks: There are only little morphological differences between the *Halter* species and also between the different genera of subfamily Nemopterinae, namely: *Lertha* Navás, 1910, *Halter* Rambur, 1842, *Brevistoma* Tjeder, 1967 and *Savignyella* Kirby, 1900. TJEDER (1967) and HÖLZEL (1999) pointed out that the examination of the genitalia of the closely related species could not always yield results, because the genitalia were very similar. Due to the sexual dimorphism, the male and the female specimens of the same species have been doubtful for a long time. Thus, the identification of the species of these genera repeatedly caused difficulties, as it shows in case of *Halter halteratus* in the literature (see below).



Fig. 2: The type specimen of *Nemoptera pallida* Olivier, 1811 preserved in MNHP - Museum National d'Histoire Naturelle, Paris, France.



Fig. 3: The type specimen of *Halter libratus* Navás, 1910 preserved in BMNH - The Natural History Museum, London, UK.

MOROCCO

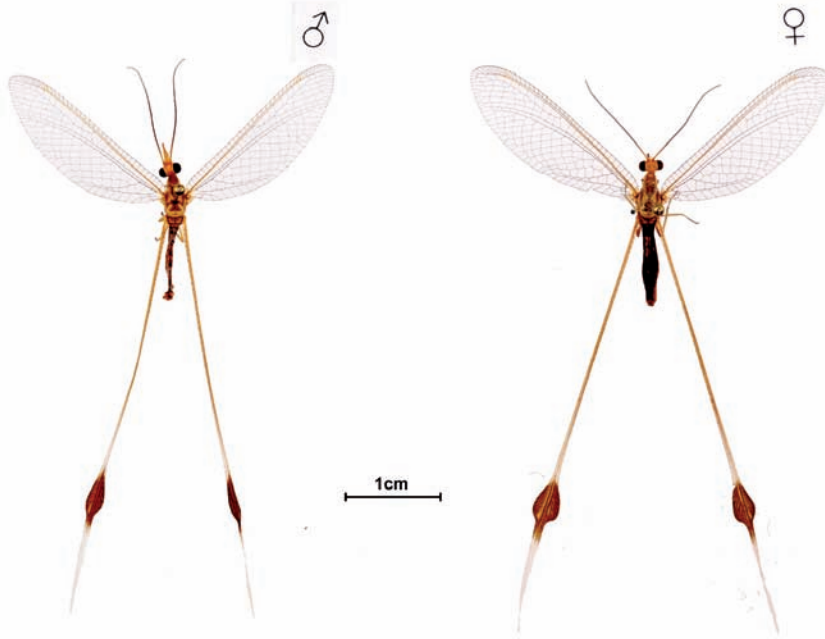
5 km from Tissint 647m
 N29°52'20.0";W07°16'45.8"
 07. 05. 2008.
 Leg: Abrahám, L. Fábrián, Gy.
 Rozner, Gy.

Halter halteratus
 (Forskål, 1775)
 det: Abrahám L.

MOROCCO

5 km from Tissint 647m
 N29°52'20.0";W07°16'45.8"
 07. 05. 2008.
 Leg: Abrahám, L. Fábrián, Gy.
 Rozner, Gy.

Halter halteratus
 (Forskål, 1775)
 det: Abrahám L.



Figs. 4-5: Habitus of *Halter halteratus*, Fig. 4: male, Fig. 5: female

Halter halteratus (Figs. 4-5) was described from the Arabian Peninsula (Yemen), but shortly after the description it was misidentified and/or confused with other species several times.

FORSKÅL (1775) published an accurate description and an excellent figure of a male specimen (FORSKÅL & CARSTEN 1776). Their figure (Fig. 1) shows some good morphological characters eg. the eye is large, the antenna is somewhat shorter than the distance between the base of wing and the pterostigma, the forewing is transparent without any patterns and the distal part of the abdomen widening to recognise the species easily.

After the description, the species was firstly mentioned by FABRICIUS (1781, 1787) in his monographs. Later, GMELIN (1788) gave a one-sentence long characterization based on the work of FABRICIUS (1787). Both authors considered *Halter halteratus* as a very similar relative of *Nemoptera coa* (Linnaeus, 1758) and regarded it as an eastern variety of *Nemoptera coa* with colourless forewing.

FABRICIUS (1798) published a new record from Morocco, which is the western part of the present known distribution of *Halter halteratus*. According to MÉNEVILLE-GUÉRIN (1829-1858), FABRICIUS (1798) confused the Moroccan specimen with *Lertha extensa* (Olivier, 1811). Although *Lertha extensa* is known only in the eastern part of

Mediterranean but a similar and later described species, *Lertha barbara* (Klug, 1836) lives in the western part of North Africa, so FABRICIUS (1798) characterized the later mentioned species as it is commented by MONSERRAT (1988).

At the end of the 18th century, OLIVIER (1797) republished the same figure (Fig. 1) drawn by FORSKÅL & CARSTEN (1776), and OLIVIER (1811) established a new combination: *Nemoptera halterata* (Forskål, 1775). A new characterization of the species was also given by him but specimen was misidentified. This misidentification was pointed out when the specimen was sent to Klug (HAGEN 1886). Consequently, *Nemoptera costata* Klug, 1836 became an objective replacement name for *Nemoptera halterata* sensu Olivier, 1811.

When KLUG (1836) realized that *Nemoptera halterata* was incorrectly identified by OLIVIER (1811) he also synonymed *Nemoptera pallida* Olivier, 1811 from Baghdad to *Halter halteratus*.

In the middle of the 19th century, RAMBUR (1842) still redescribed *Nemoptera pallida* Olivier, 1811 including the sexual dimorphism. The specimens examined by RAMBUR (1942) were collected by Olivier near Baghdad. RAMBUR (1842) also published an unsatisfactory quality figure on the female specimen (RAMBUR 1842, pl. 8. fig. 4), as it commented by HAGEN (1886).

In the first half of the 19th century, those species [eg. DUMÉRIL (1823) - *Lertha extensa*; BLANCHARD (1840) - *Savignyella costata*; HAGEN (1866) - *Nemoptera sinuata* var.; KLUG (1836) - *Nemopterella africana* (Leach, 1815)] resembling to *Nemoptera halterata* were time by time misidentified. For these misidentifications KLUG (1836), MÉNEVILLE-GUÉRIN (1829-1858), HAGEN (1886) and KIRBY (1900) called the attention.

At the same time, the descriptions of two new species (*Nematoptera forskalli* Westwood, 1841, *Nematoptera olivierii* Westwood, 1841) also caused additional nomenclatural problems.

Nematoptera forskalli Westwood, 1841 was a synonym of *Halter halteratus* (Forskål, 1775), which was firstly revealed by HAGEN (1866) and later by NAVÁS (1910). Probably, WESTWOOD (1841) described an other species because FABRICIUS (1781, 1787, 1798), OLIVIER (1811) and DUMÉRIL (1823) also misidentified this species in their works. *Nematoptera olivierii* Westwood, 1841 proved to be a junior synonym of *Savignyella costata* (Klug, 1838) (GÜSTEN 2003).

In the second half of the 19th century SÉLYS LONGCHAMPS (1866) figured a male specimen of *Halter halteratus* correctly. In the same year, HAGEN (1866) collected and published all synonyms and misidentified species which relating to *Halter halteratus*.

At the beginning of the 20th century there was so high number of incorrect information on *Halter halteratus* that KIRBY (1900) did not list them any more.

The first comprehensive revision of the family was published by NAVÁS (1910). This monograph summarized both significant taxonomical features and nomenclatural data as well as the known distribution. Soon after, he also compiled a key for these taxa (NAVÁS 1912a). Nevertheless, the correct identification of *Halter halteratus* remained uncertain during the 20th century.

Based on the present knowledge of the distribution, the faunistical data need revision (eg. Sierra Leone - WALKER (1853); Oman - NAVÁS (1910), WHITTINGTON (2002); Syria - WALKER (1853), NAVÁS (1912a), AUBER (1955); Iran - NAVÁS (1927), AUBER (1955); India - NEEDHAM (1909), GHOSH (1977), GHOSH & SEN (1977); Israel - SIMON (1983); Pakistan and the United Arab Emirates (as Trucial States) - WHITTINGTON (2002)).

Besides from the description of *Halter libratus* Navás, 1910, there is no more published information on the distribution of this species. HÖLZEL (1999) supposed that it was a synonym of *Halter halteratus* (Forskål, 1775). Although, NAVÁS (1910) listed five dif-

ferences between the two species but all of them seemed merely to be a colour variety. Thus, I checked the type female specimen in the Natural History Museum in London and confirmed that it was a new junior synonym of *Halter halteratus* (Forskål, 1775).

General distribution:

Asia: Yemen - FORSKÅL 1775, FABRICIUS 1781, MEINANDER 1980, HÖLZEL 1999, ASPÖCK et al. 2001, MONSERRAT 2008; Saudi Arabia - KIRBY 1900, NAVÁS 1912a, AUBER 1955, MEINANDER 1980, HÖLZEL 1999, ASPÖCK et al. 2001, MONSERRAT 2008; Kuwait - MEINANDER 1980, HÖLZEL 1999, ASPÖCK et al. 2001, MONSERRAT 2008; Iraq - WALKER 1853, KIRBY (1900), MORTON (1921), WHITTINGTON (2002).

Africa: Morocco - MONSERRAT et al. 1990, ASPÖCK & HÖLZEL 1996, HÖLZEL 1999, ASPÖCK et al. 2001, MONSERRAT 2008; Algeria - RAMBUR 1842, NAVÁS 1913a, ESBEN-PETERSEN 1918, AUBER 1955, ASPÖCK & HÖLZEL 1996, HÖLZEL 1999, ASPÖCK et al. 2001, MONSERRAT 2008; Tunisia - ASPÖCK & HÖLZEL 1996, HÖLZEL 1999, ASPÖCK et al. 2001, MONSERRAT 2008; Egypt - RAMBUR 1842, WALKER 1853, KIRBY 1900, NAVÁS 1912a, AUBER 1955, ASPÖCK & HÖLZEL 1996, HÖLZEL 1999, ASPÖCK et al. 2001, MONSERRAT 2008; Sudan - NAVÁS 1910, HÖLZEL 1999, ASPÖCK et al. 2001, MONSERRAT 2008.

Halter nutans Navás, 1910 (Figs. 6-7).

Type: Pakistan, Quetta BMNH - The Natural History Museum, London, UK – not seen.

Halter nutans Navás, 1910 - NAVÁS 1910 (Odescr), 1912a (Dist), ALEXANDROVA-MARTYNOVA 1930, (Tax, Dist), KIMMINS 1950 (Dist), GHOSH & SEN 1977 (Dist), HÖLZEL 1998 (Dist), 1999 (Dist), ASPÖCK et al. 2001 (Dist), SZIRÁKI 2011 (Dist), CHANDRA & SHARMA ? (Dist)

Halter halteratus (Forskål, 1775) - NAVÁS 1912b (Misid, Dist), HÖLZEL 1968 (Misid, Dist),

Material examined:

Iran, Heraug 2000.04.18 Leg.: Juhász I. 13♂ 21♀; Iran, Prov. Hormozgan Bandar'e Abbas 20-21.04.2000. leg. L. Damai 1♂ 2♀; Iran, Prov. Hamedan Nevahand 2400m 2000.07.09. Leg.: Hác T., Kőszegi G. 1♂; Iran, Prov. Hormozgan Dar Gur (Bandare Abbas) 2000.IV.19. leg. Gaskó K. 2♀; Iran, Quir előtt 15km Firuzabad felé szél.: 28-30° hossz.:52°-54° 2004.04.12. Leg.: Hác T., Benedek B.2♂ 1♀; Iran, Prov. Fars Lar 17.04.2000 leg. L. Damai 1♂; Iran, Prov. Färs Mts. Zagros, Lär, N27°36,108,1'; E054°19,656' 880m, IV.29-30.,2009 by light leg. Hác T., Székely K., Vig K. 2♂ 2♀; Iran, Prov. Fars, Persepolis, Mt Kum, 1200m 2000.V.26.leg. Gaskó K. 2♂ 1♀; Iran, Prov. Markazi, Kavir Desert Houz-e Soltan, 3km S Kusk-e Nosrat 830m, 28.VI.2000. Fábíán Gy., Szécsényi L., Székely K. 1♂; Iran, Prov. Yazd Mazra ehye Taqi. 2582m N 31° 34,949 E 53° 49,387 2005.07.04. Leg.: Ábrahám L. 3♀; Iran, Prov. Esfahan Kuh-e-Karkas, 1600m. 7km NW of Natanz 11-12.06. 2005. Leg.:P. Gyulai & A. Garai 1♂ 1♀; Iran, Prov. Esfahan, Mt.Kühha Qohrud, Vill. Ozvar, 2000.VI.18-19 leg Rozner Gy.1♀; Iran, Prov. Esfahän, Kuhhã-ye Qohrud, Muteh 2020m N33°38,0'; E 050° 54,1'2012.06.08. Leg.: G. Petrányi, S. Ilniczky 6♂ 1♀; Iran, Prov. Esfahän, Kuhhã-ye-Qohrud, Qamsar 1770m N 33°44,3'; E051°28,7'2012.06.07. Leg.:G. Petrányi, S. Ilniczky 5♂ 3♀; Oman, Thaqib (2km near to Al Ulya) S of Al Alawi N 16°48,001'; EO 53°32,834' 2008.04.16. Leg.: Ilniczky S. Simonyi S. 1♂; Oman, Al Muladdah 43m N 23°42,134'; EO57°32,503' 2008.04.15. Leg.: Ilniczky S., Simonyi S.7♂22 ♀; Oman, Jabal Ashoor 424 m N17° 04;578'.EO 54°31 '639'2008. 04. 26. Leg.: Ilniczky S . Simonyi S 1♂ 1♀.

Deposited in the entomological collection of Museum Kaposvár (Hungary).

Remarks: NAVÁS (1910) published the first comprehensive monograph on Nemopteridae in which he described *Halter nutans* Navás, 1910 but the type locality was misquoted as Quetta from the southern part of Africa.

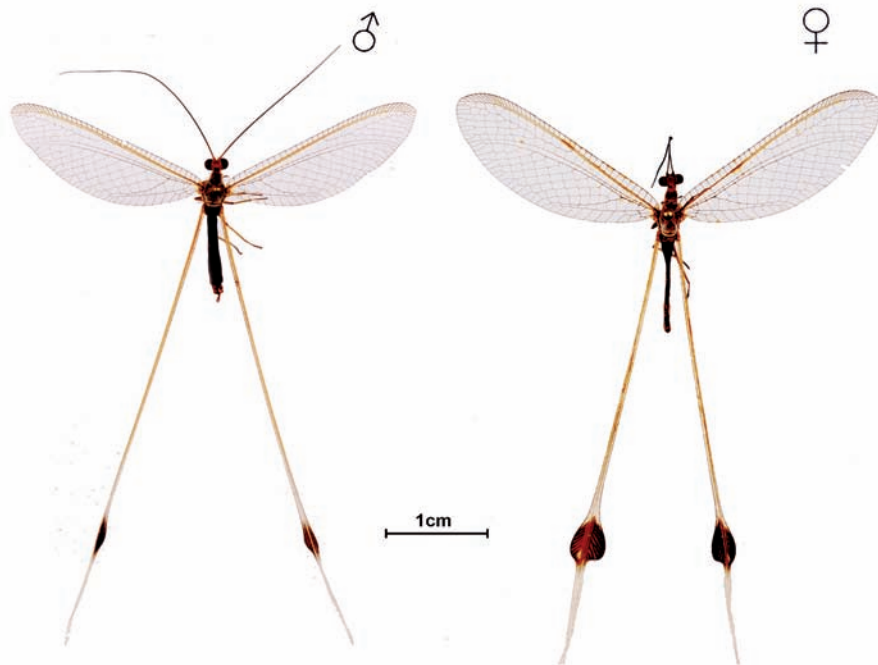
Later, ALEXANDROVA-MARTYNOVA (1930) corrected the geographical position of the type locality and gave some new records from Iran (Baluchistan). Baluchistan is situated in the territory of South East Iran, South Afghanistan and South West Pakistan.

OMAN
Al Muladdah 43 m
N 23° 42, 13'4", EO 57° 32, 503'
2008. 04. 15.
Leg.: Ilinczky S., Simonyi S.

Halter nutans
Navás, 1910
Det: Ábrahám L.

OMAN
Al Muladdah 43 m
N 23° 42, 13'4", EO 57° 32, 503'
2008. 04. 15.
Leg.: Ilinczky S., Simonyi S.

Halter nutans
Navás, 1910
Det: Ábrahám L.



Figs. 6-7: Habitus of *Halter nutans*, Fig. 6: male, Fig. 7: female

General distribution:

Asia: Iraq - KIMMINS 1950, HÖLZEL 1968, 1999, Oman - HÖLZEL 1999, Afghanistan - HÖLZEL 1968, 1999, Iran - ALEXANDROVA-MARTYNOVA 1930, KIMMINS 1950, HÖLZEL 1968, 1999, Pakistan - NAVÁS 1910, KIMMINS 1950, HÖLZEL 1999, ASPÖCK et al. 2001, the United Arab Emirates - SZIRÁKI 2011, India - KIMMINS 1950, GHOSH & SEN 1977, CHANDRA & SHARMA (?).

Halter albostigma (Westwood, 1874)

Nemoptera albo-stigma [sic] Westwood, 1874 - WESTWOOD 1874 (Odescr)

Halter albostigma (Westwood, 1874) – NAVÁS 1910 (K, Dist), 1912a (Dist), 1914 (Redescr), TJEDER 1967 (K)

Material examined:

The type specimen of *Halter albostigma* (Westwood, 1874) preserved in Hope-Westwood Entomological Collections, Oxford University, UK. (Fig. 8)

The type label information: white label: // Type: Neur. No. 31/ Nemptera / albo-stigma / Westwood [with unknown handwriting] / Hope Dept. Oxford //; white label: // Halter / albostigma Westw. // [with Navás's handwriting] / Long. Navás det. //; white label: // Zulu? / Stevens 1866 2s. // [with unknown handwriting].

Type condition: good, tip of abdomen broken, glued to a white label.

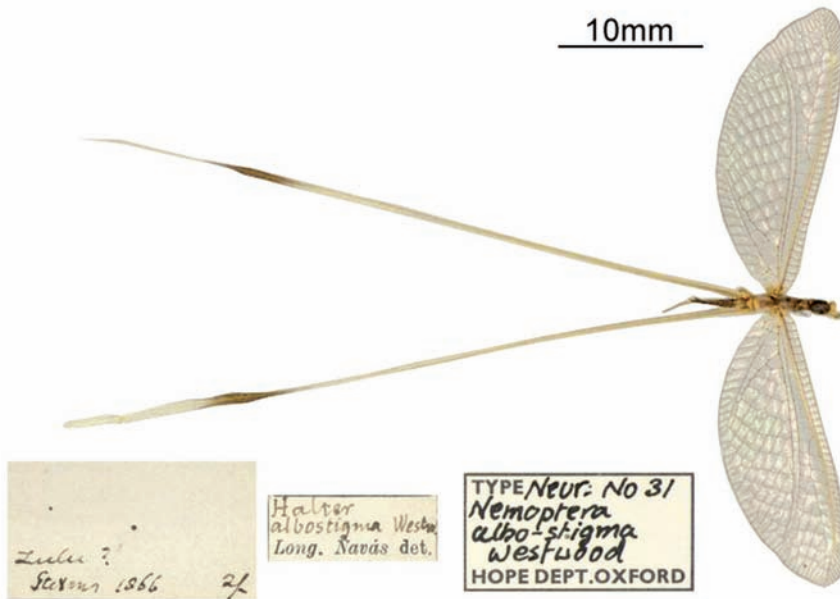


Fig. 8: The type specimen of *Halter albostigma* (Westwood, 1874) preserved in Hope-Westwood Entomological Collections, Oxford University, UK

Additional non types: Pakistan Tamrao MPS [Mirpur Khas] DT 12.10. 2011 leg. Abdul Rahman Azeemi 1♂ 2♀; Pakistan Tamrao Mirpurkhas DT2 12.10. 2011 leg. Abdul Rahman Azeemi 1♂ 1♀; Pakistan Tamrao Mirpurkhas DT2 13.10. 2011 leg. Abdul Rahman Azeemi 2♀; Pakistan Thar 14.10. 2011 leg. Abdul Rahman Azeemi 1♂ 5♀; Pakistan Islamkot 28. 10. 2011 leg. Abdul Rahman Azeemi 1♀
 Deposited in the entomological collection of Museum Kaposvár (Hungary); and in John O'Dell's private entomological collection in Newport, UK.

Redescription (Figs. 9-10).

Head: Vertex pale yellow, somewhat narrower than width of eye. Frons, occiput and postocular part pale yellow. Clypeus and labrum pale yellow, clypeus 1.5 times longer than labrum. Mouth part pale yellow except last light brown labial segment. Head capsule hairless. Scape, pedicel and basal part of flagellum pale yellow. Distal part of scape with indistinct narrow and brown ring. Flagellum with very short and dark brown setae. Last segment of flagellum acute. Antenna 12 mm long, not reach pterostigma.

Thorax: Pronotum pale yellow with wide longitudinal brown band. Indistinct pale yellow pattern in brown band of pronotum. Pronotal margins with sparse short and white hairs. Mesonotum pale yellow with wide brown central band and two wide brown lateral bands and with sparse short and white hairs. Metanotum pale yellow with sparse short and white hairs. Sides pale yellow with sparse short and white hairs.

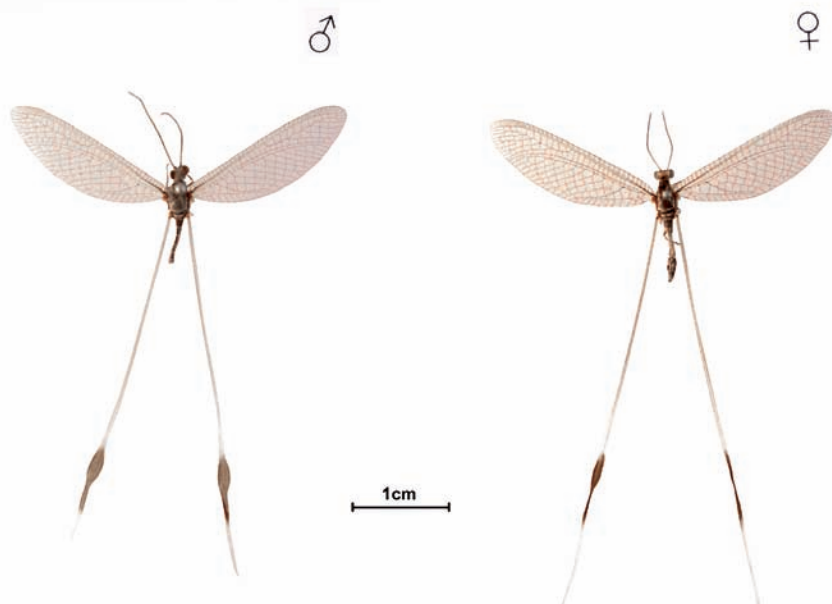
Legs: Yellow with short stiff brown hairs. Tibiae longer than femora. Tarsal segment 1 as long as segment 2-5 combined, segment 5 as long as segment 2-4 combined. Basal part of claws shiny yellow distal part shiny reddish brown.

PAKISTAN
 Tamrao – Mirpurkhas
 DT. 2
 12. 10. 2011.
 Leg.: Abdul Rehman
 Azeemi

Halter albostigma
 (Westwood, 1874)
 Det: Ábrahám L.

PAKISTAN
 Tamrao = MPS. DT.
 12. 10. 2011.
 Leg.: Abdul Rehman
 Azeemi

Halter albostigma
 (Westwood, 1874)
 Det: Ábrahám L.



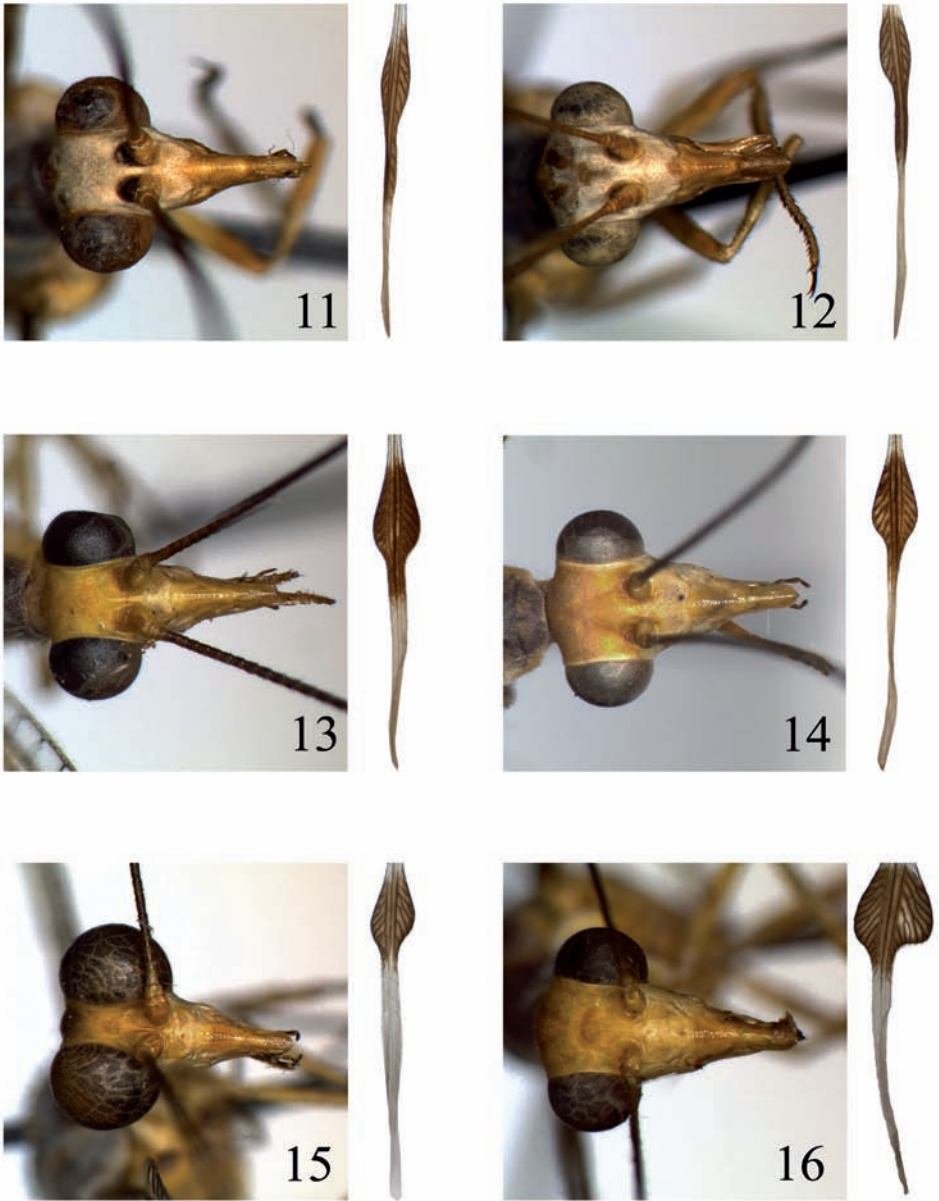
Figs. 9-10: Habitus of male *Halter albostigma*, Fig. 9: male, Fig. 10: female

Wings: Forewing 18 mm long and 5 mm wide. Membrane transparent, subcostal cell yellowish white. C pale with dense short smoothing and brown setae. Sc pale with small brown spots at base on each costal cross-vein proximally. Longitudinal veins pale with small brown dashes at cross-veins. All cross-veins light brown including in costal area. Pterostigma small indistinct yellowish white. 10-11 cross-veins between R and M, before Rs. 12 cross-veins between R and Rs. Hindwing: 37 mm long. Longitudinal veins pale yellow, R yellowish brown in basal part, cross-veins brownish. Dilation narrow with one pale brown cross-band in membrane. Pale brown cross-band in membrane as long as yellowish white apical part of hindwing.

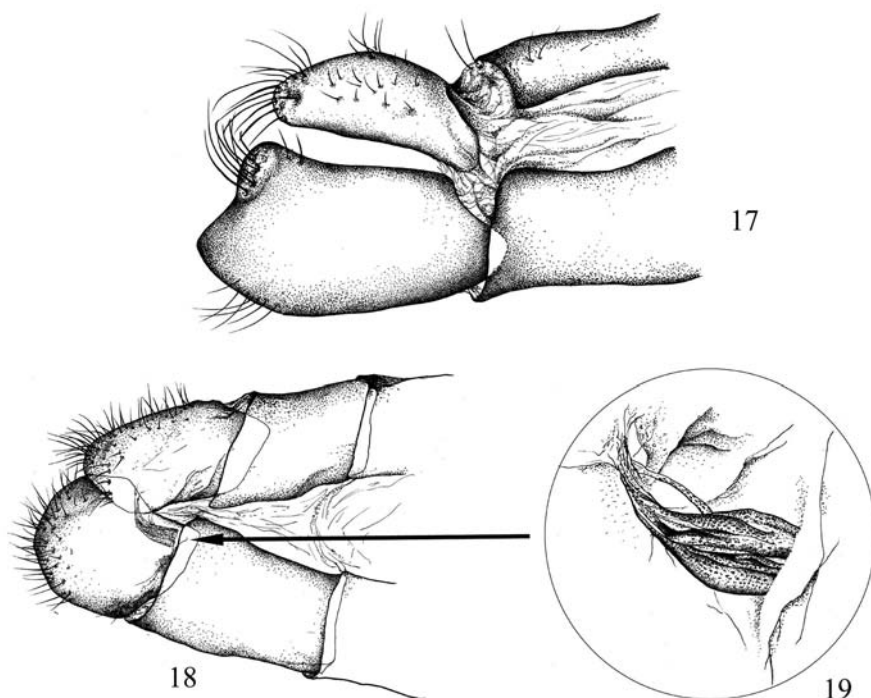
Abdomen: Tergites yellow with central narrow brown line and lateral wide brown bands. Sternites yellow. Abdominal segments with sparse smoothing and white hairs.

Genitalia: Male. Ectoproct elongate with rounded apex and medium long brown hairs. Sternite 9 1.5x longer than wide with long white hairs but subacute lateral corners with long brown hairs, distal margin straight. Apex of abdomen as in Fig. 17 in lateral view. Gonarcus and parameres as in Fig. 22 in caudal view and as in Fig. 23 in lateral view.

Female. Both ectoproct and lateral gonapophyses oval with brown hairs distally as in Fig. 18 in lateral view. A sclerotized brush-like structure on each side below ectoproct as in Fig. 19 in lateral view. Spermatheca elongate slightly chitinised.



Figs. 11-16: Head in frontal view and terminal part of hind wing; Fig. 11: *Halter halteratus* male, Fig. 12: *Halter halteratus* female, Fig. 13: *Halter albstigma* male, Fig. 14: *Halter albstigma* female, Fig. 15: *Halter nutans* male, Fig. 16: *Halter nutans* female



Figs. 17-19: Genitalia of *Halter albostigma* in lateral view; Fig. 17: Male genitalia, Fig. 18: Female genitalia, Fig. 19: Part of female genitalia (magnified)

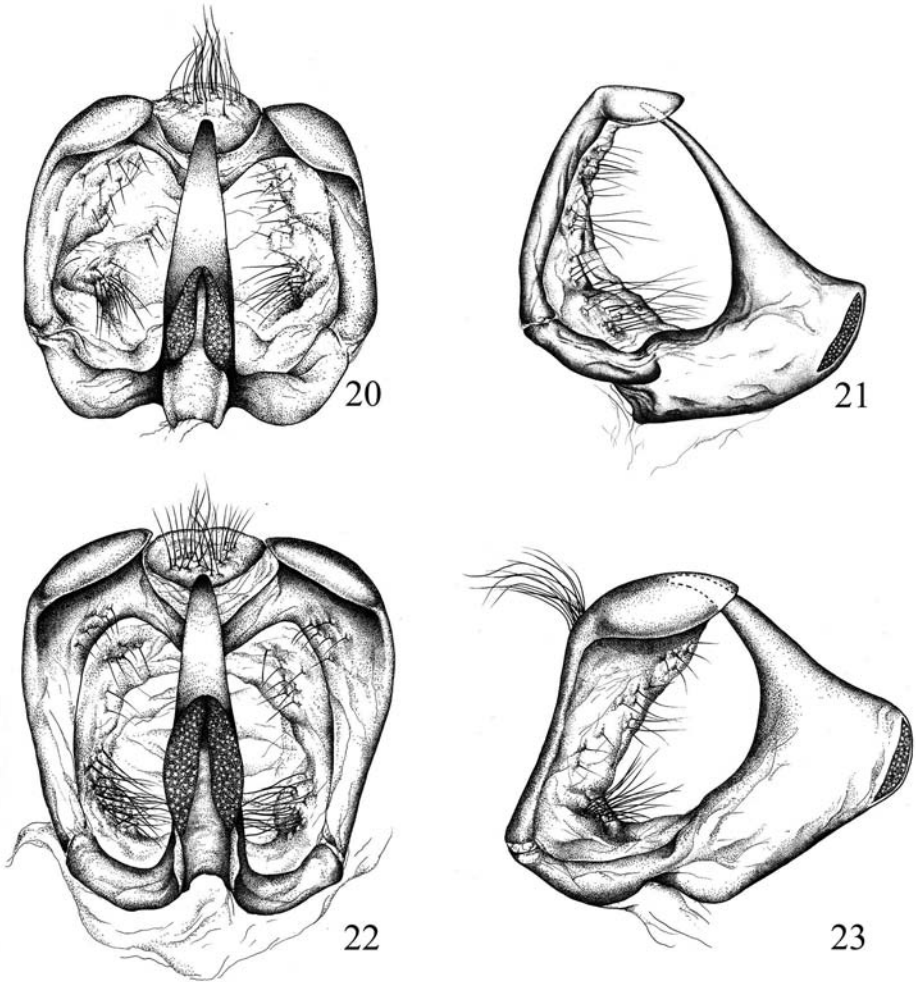
Remarks: Except for its description (Westwood 1874), there was no other information about the species in the literatures. Studying the type specimen and its label, TJEDER (1967) supposed the type locality Zululand (a district of KwaZulu-Natal, South Africa) was incorrect since all *Halter* species spread in North Africa and Middle East. The label information “Zulu?/Stevens 1866 2/” means the specimen was bought in an auction for 2 shillings and the presence of a question-mark after refers for the uncertain locality.

The morphology of the examined additional non type material from Pakistan agrees with the type preserved in the Hope-Westwood Entomological Collections, Oxford in every respect.

The checklist of India (GHOSH & SEN 1977) and the another one which has recently been compiled by CHANDRA & SHARMA (?) mentioned the co-existence of both species namely, *Halter halteratus* and *Halter nutans*. Probably, the distribution data of *Halter halteratus* refers to *Halter albostigma*. Both species fly during the first half of the year, from spring to mid-summer (MEINANDER 1980, HÖLZEL 1999, SZIRÁKI 2011), the flying period depends on the altitude in the Western Palearctic mountainous areas. The seasonal activity of *Halter albostigma* ranges from Autumn to Spring.

General distribution:

The type material was mislabelled, probably that was collected in the former colony of Great Britain. Now, these territories belong to Pakistan (Sindh, Punjab) and India (Gujarat, Rajasthan).



Figs. 20-23: Male inner genitalia Gonarcus and parameres complex in caudal view and lateral view; Figs. 20-21: *Halter halteratus*, Figs. 22-23: *Halter albstigma*

Table 1. The comparative matrix for separating the species

Characters	<i>H. halteratus</i>	<i>H. nutans</i>	<i>H. albostigma</i>
length of male antenna	almost reach to pterostigma	longer than the distance of base and pterostigma	shorter than the distance of base and pterostigma
length of female antenna	reach to the origin of Rs	as long as 2/3 the base and and pterostigma	Reach to the origin of Rs
eye size	normal	large	normal
distance between eyes	at least 1.5x longer than diameter of eye	shorter than diameter of eye	at least 1.5x longer than diameter of eye
branches in Rs	5	6	4
No of cross-veins before Rs	12-13	12-13	10-13
apex of FW	rounded	slightly rounded	rounded
dilation of male HW	medium	medium	narrow
dilation of female HW	medium	wide	narrow
proportion of preapical brown part and apical white part	preapical brown part slightly longer than apical white part	preapical brown part at least 2x shorter than apical white part	preapical brown part as long as apical white part
distribution	N Africa, Arabia	Iraq, E Arabia, W India	SE Pakistan, W India



Fig. 24: The type specimen of *Eretmoptera neglecta* Navás, 1910

Appendix for Asiatic Nemopteridae

So far, only two species of Nemopterinae are known, namely *Eretmoptera neglecta* Navás, 1910 (Fig. 24) and *Nemopistha sinica* C.-k. Yang, 1986 (Fig. 25) in the Oriental realm (India, South China).

According to TJEDER (1967) *Eretmoptera neglecta* was supposed to be a synonym of *Eretmoptera biremis* (Kolbe, 1900) but he did not find the type material in the Paris Museum (Muséum National d'Histoire Naturelle, Paris, France).

Earlier, NAVÁS (1912a) also synonymed his own described species to *Nemopterella biremis* (Kolbe, 1900) so TJEDER (1967) moved this species to a new combination as *Barbibucca biremis* (Kolbe, 1900).

The type specimen of *Eretmoptera neglecta* Navás, 1910 has been recently found, so the status of the type could be checked. The type specimen is characterized with haired head and partly hairy antennae which featured the genus *Barbibucca* Tjeder, 1967. The species is characterized with yellowish brown spots between the costals and pale beyond the pterostigma in the costal area of the forewing.

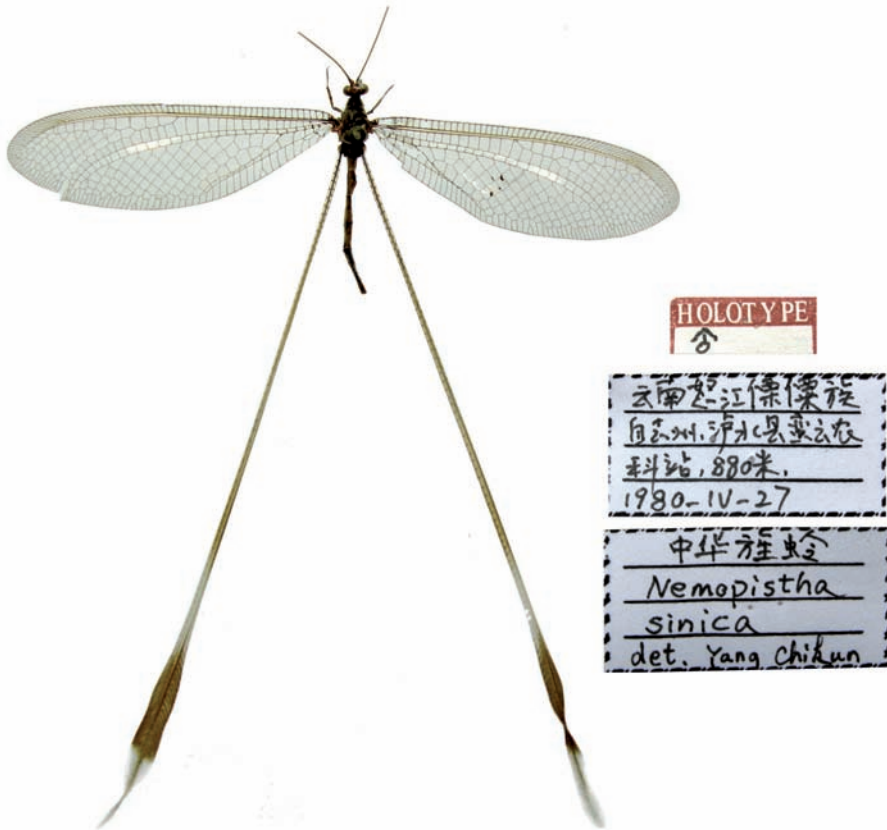


Fig. 25: The type specimen of *Nemopistha sinica* C.-k. Yang, 1986

Label information: white label with red letters //Type//; white label: // Eretmoptera / neglecta / Nav. // [with Navás's handwriting], white label: // Nemopterella / biremis ? Kolbe. Cap? [with Navás's handwriting] / Login Navás det. //; white label: // Eretmoptera / neglecta Nav. /type / [with unknown handwriting] /Login Navás det. 1910 //, white label: // Museum Paris //

Type condition is medium, the left antenna lost.

Remarks: The type specimen can not be collected in India as it was mentioned by NAVÁS (1910) in the original description since all known specimens and also the type of *Barbibuca biremis* were recorded only in South Africa. NAVÁS (1910) published the type locality to India incorrectly. Checking the type specimen it has not got any label referring to the collecting site.

The other one species of Nemopterinae, *Nemopistha sinica* C.-k. Yang, 1986 was described from China. So far, only the type specimen has been known from South China, Yunnan province (YANG 1986).

It is slightly larger than *Halter* species, the length of forewing 26 mm and that of hindwing 60 mm. Vertex brown with narrow edge next to eye. The basal part of antenna is yellow (distal part broken), its length is unknown. Its eye is rather large, its diameter is 1.5x longer than rostrum.

There are 15-16 cross-veins before Rs. Rs is with 8 branches. Pterostigma is pale yellow. Hypostigmatic cell is about as long as wide. The dilation is narrow and double, preapical brown brand is slightly longer than white apical part in hindwing.

According to the type label the specimen is male but the genitalia probably lost.

Label information: red and white label: // Holotype / male //, white label written in Chinese // Yunnan Prov., / Nuijiang Lisu Aut. Pro., / Lushui Co. 880m / 1980-VI-27 //, white label written in Chinese // [?????? with Chinese letters] / *Nemopistha / sinica / det. Yang Chikun //*

Type is deposited in CAU – China Agricultural University, Beijing, China.

Remarks: The male genitals usually feature the genera. Due to the missing genitalia the valid genus can not be identified but it can not be congeneric with African genus *Nemopistha* Navás, 1910.

Acknowledgement

I wish to express my grateful thanks to Ms Amoret Spooner who is responsible for Hemiptera and Small Orders, Entomology Collections at the Oxford University Museum of Natural History, Oxford, UK, Dr. Benjamin Price, curator for Odonata and Small Orders, Life Sciences Department, Natural History Museum, (NHM) London, UK, Mr. Matthieu Giacmino Saint-Berthevin (France) as well as Mr. Jean Legrand, the curator for Muséum National d'Histoire Naturelle, Paris, (France) for providing photos of the type material. I would like to express my deepest appreciation to Professor Wang Xinli who provided me the possibility to study the type material in the collection of China Agricultural University, Beijing. My special thank to John O'Dell, (Newport, UK) for loaning specimens to study from his excellent private collection. I would also like to wish my deepest thanks to Mrs. Ágnes Nagy for the excellent figures.

References

- ALEXANDROVA-MARTYNOVA, O. M. 1930: Zur Kenntnis der Nemopteriden Persiens und einiger Mittelmeerländer. *Zoologischer Anzeiger* 90, 235–250.
- ASPÖCK, H. & HÖLZEL, H. 1996: The Neuropteroidea of North Africa, Mediterranean Asia and of Europe: a comparative review (Insecta). In CANARD, M., ASPÖCK, H. & MANSELL, M. W. (Eds.). *Pure and Applied Research in Neuropterology. Proceedings of the Fifth International Symposium on Neuropterology* (2-6 May 1994, Cairo, Egypt). Privately printed, Toulouse, France, pp. 31–86.
- ASPÖCK, H., HÖLZEL, H. & ASPÖCK, U. (2001) Kommentierter Katalog der Neuropterida (Insecta: Raphidioptera, Megaloptera, Neuroptera) der Westpaläarktis. *Denisia* 2, 1–606.
- ASPÖCK, U.; LETARDI, A.; ASPÖCK, H. 2006: *Nemoptera rachelii* n. sp. -- eine neue Spezies der Familie Nemopteridae aus dem Iran (Neuropterida, Neuroptera). *Entomologische Nachrichten und Berichte* 50:29-34.
- AUBER, J. 1955: Liste des Névroptères planipennes du Sahara nord occidental. - *Revue Française d'Entomologie* 22: 53–58.
- BLANCHARD, C. É. 1840: *Histoire Naturelle des Insectes Orthoptères, Névroptères, Hémiptères, Hyménoptères, Lépidoptères et Diptères*. - Vol. 3. P. Duménil, Paris, 672 pp.
- BURMEISTER, H. C. C. 1839: *Handbuch der Entomologie. Zweiter Band. Besondere Entomologie. Zweite Abtheilung. Kakerfe. Gymnognatha*. - (Zweite Hälfte; vulgo Neuroptera). Theod. Chr. Friedr. Enslin, Berlin, [i]-xii + 757–1050.
- CHANDRA K. & SHARMA, R. M. (????) Check list of Indian neuropterids (Insecta: Megaloptera; Raphidioptera; Neuroptera). - <http://zsi.gov.in/checklist/neuroptera.pdf> (accessed: on 18 May 2013)
- DESMAREST, A. G. 1849: [Nemoptera and Nemopterix]. P. 611 in *Dictionnaire universel d'histoire naturelle*. A. C. V. D. d'Orbigny, ed. Vol. 8. Paris. 766 pp.
- DUMÉRIL, C. 1823: *Considérations générales sur la classe des insectes*. - Paris: F. G. Levrault. [Plate 27 Fig.7]
- ESBEN-PETERSEN, P. 1918: Neuropteren der inneren Sahara. (Aus der sammelausbeute des Freiherrn Hans von Geyr). - *Archiv für Naturgeschichte* (A), 84(9): 143–159.
- FABRICIUS, J. C. 1781: *Species insectorvm exhibentes eorvm differentias specificas, synonyma avctorvm, loca natalia, metamorphosin adiectis observationibvs, descriptionibvs*. - *Hamburgi et Kilonii*, Tome 1, 552 pp.
- FABRICIUS, J. C. 1787: *Mantissa Insectorvm sistens eorvm species nyper detectas adiectis characteribvs genericis, differentiis specificis, emendationibvs, observationibvs*. - Chr. G. Proft, Hafniae. Tome 1, 519 pp.
- FABRICIUS, J. C. 1798: *Supplementum entomologiae systematicae*. - Hafniae. 572 pp.
- FORSKÅL, P. 1775: *Descriptiones animalium avium, amphibiorum, piscium, insectorum, vermium; quae in itinere orientali observavit Petrus Forskål*. - Hauniae. 164 pp.
- FORSKÅL, P. & CARSTEN, N. 1776: *Icones rerum naturalium, quas in itinere Orientali depingi curavit*. - Hauniae [i.e., Copenhagen]: Ex officina Mölleri, MDCCLXXVI [1776].
- GHOSH, S. K. 1977: Fauna of Rajasthan, India -- Neuroptera. *Records of the Zoological Survey of India* 72: 309–313.
- GHOSH, S. K. & SEN, S. 1977: Check-list of Indian Planipennia (Order Neuroptera). - *Records of the Zoological Survey of India* 73: 277–326.
- GMELIN, J. F. 1788: *Caroli a Linne, equatis aurati de stella polari, à systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis ... Editio decima tertia [=13th Edition], aucta, reformata*. - Tom. 1, Pars IV and Pars V. Georg. Emanuel Beer, Lipsiae
- GUÉRIN-MÉNEVILLE, F. É. 1829-1858: *Iconographie du règne animal de G. Cuvier, ou représentation d'après nature de l'une des espèces les plus remarquables, et souvent non encore figurées, de chaque genre d'animaux*. - Insectes. Paris, 576 pp.
- GÜSTEN, R. 2003: A checklist and new species records of Neuropterida (Insecta) for Tunisia. *Kaupia: Darmstädter Beiträge zur Naturgeschichte* 12:129-149.
- HAGEN, H. A. 1866: *Hemerobidarum Synopsis synonymica*. - *Stettiner Entomologische Zeitung* 27: 369–462.
- HAGEN, H. A. 1886: *Monograph of the Hemerobidae. Part I. Nemopteridae*. - *Proceedings of the Boston Society of Natural History* 23: 250–269.
- HÖLZEL, H. 1968: *Die Neuropteren Vorderasiens III. Nemopteridae*. - *Beiträge zur Naturkundlichen Forschung in Südwestdeutschland* 27: 37–47.

- HÖLZEL, H. 1998: Zoogeographical features of Neuroptera of the Arabian peninsula. In PANELIUS, S. P. (ed.). *Neuropterology 1997. Proceedings of the Sixth International Symposium on Neuropterology (13-16 July 1997, Helsinki, Finland)*. - *Acta Zoologica Fennica* 209: 129–140.
- HÖLZEL, H. 1999: Die nemopteriden (Fadenhafte) Arabiens: ein Beitrag zur Kenntnis der Neuroptera der Arabischen Halbinsel (Neuropterida: Neuroptera: Nemopteridae). - *Stapfia* 60: 129–146.
- KIMMINS, D. E. 1950: The 3rd Danish Expedition to Central Asia. Zoological Results 4. Odonata, Ephemeroptera and Neuroptera (Insecta) from Afghanistan. - *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening, Kobenhaven* 112: 235–241.
- KIRBY, W. F. 1900: Notes on the neuropterous family Nemopteridae. - *Annals and Magazine of Natural History* (7)6: 456–464.
- KLUG, J. C. F. 1836: Versuch einer systematischen Feststellung der Insekten-Familie: Panorpatae und Auseinandersetzung ihrer Gattungen und Arten. - *Abhandlungen der Koniglichen Akademie der Wissenschaften zu Berlin* 1836, 81–108.
- LAMARCK, J. B. A. P. C. de 1817: Histoire naturelle des animaux sans vertèbres, présentant les caractères généraux et particuliers de ces animaux, leur distribution, leurs classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent; précédée d'une introduction offrant la détermination des caractères essentiels de l'animal, sa distinction du végétal et des autres corps naturels, enfin, l'exposition des principes fondamentaux de la zoologie. - Vol. 4. Deterville & Verdier, Paris, 603 pp.
- LATREILLE, P. A. 1802: Histoire naturelle, generale et particuliere de Crustaces et des Insectes. - Vol. 3. Dufart, Paris, 467 pp.
- LEACH, W. E. 1815: Zoological miscellany; being descriptions of new, or interesting animals. Vol. 2. London, pp. 73–75.
- MEINANDER, M. 1980: Insects of Saudi Arabia. Neuroptera: Fam. Nemopteridae. - *Fauna of Saudi Arabia* 2: 174–178.
- MONSERRAT, V. J. 1988: Revision de las especies de Lertha del Mediterraneo occidental (Neuropteroidea, Planipennia: Nemopteridae). - *Annali del Museo Civico di Storia Naturale Giacomo Doria* 87:85-113.
- MONSERRAT, V. J. 2008: Nuevos datos sobre algunas especies de Nemopteridae y Crocidiae (Insecta: Neuroptera). - *Heteropterus: Revista de Entomología* 8: 1–33.
- MONSERRAT, V. J., DÍAZ-ARANDA, L. M. & HÖLZEL, H. 1990: Contribucion al conocimiento de los neuropteros de Marruecos (Insecta, Neuropteroidea). - *EOS: Revista Espanola de Entomologia* 66: 101–115.
- MORTON, K. J. 1921: Neuroptera, Mecoptera, and Odonata from Mesopotamia and Persia. - *Entomologist's Monthly Magazine* 57: 213–225.
- NAVÁS, L. 1910: Monografía de los Nemoptéridos (Insectos Neurópteros). - *Memorias de la Real Academia de Ciencias y Artes de Barcelona* (3)8: 341–408.
- NAVÁS, L. 1912a: Family Nemopteridae. Neuroptera. - *Genera Insectorum* 136: 1–23.
- NAVÁS, L. 1912b: Bemerkungen über die Neuropteren der Zoologischen Staatssammlung in München. III. - *Mitteilungen der Münchener Entomologischen Gesellschaft* 3: 55–59.
- NAVÁS, L. 1912c: Insectos neurópteros nuevos o poco conocidos. - *Memorias de la Real Academia de Ciencias y Artes de Barcelona* (3)10: 135–202.
- NAVÁS, L. 1913a: Expedition to the central western Sahara. X. Quelques Névroptères du Sahara Français. - *Novitates Zoologicae* 20: 444–458.
- NAVÁS, L. 1913b: Les Névroptères. - *Annales d'Histoire Naturelle, Délégation en Perse, Paris* 2: 13–16.
- NAVÁS, L. 1914: Neurópteros nuevos o poco conocidos (Segunda [II] serie). - *Memorias de la Real Academia de Ciencias y Artes de Barcelona* (3)11: 105–119.
- NAVÁS, L. 1926: Névroptères d'Égypte et de Palestine. 3me partie. - *Bulletin de la Société [Royale] Entomologique d'Égypte* 10: 192–216.
- NAVÁS, L. 1927: Zur Erforschung des Persischen Golfes (Beitrag Nr. 4). Neuroptera. - *Entomologische Mitteilungen* 16: 183–185.
- NEEDHAM, J. G. 1909: Notes on the Neuroptera in the collection of the Indian Museum. - *Records of the Indian Museum, Calcutta* 3: 185–210.
- OLIVIER, G. A. 1797: Tableau encyclopedique et methodique des trois regnes de la nature. - *Dix-huitieme Parte (Insectes)*. H. Agasse, Paris. 142 pp. [Plate 98]
- OLIVIER, G. A. 1811: Encyclopedie Méthodique. - *Histoire Naturelle, Insectes*. Vol. 8. Paris. Némoptère, Nemoptera, pp. 175-179.
- OSWALD, J. D. 2007: Neuropterida Species of the World. Version 2.0. -<http://lacewing.tamu.edu/Species-Catalogue/>. (accessed on 9 July 2012)

- OSWALD, J. D. & PENNY, N. D. 1991: Genus-group names of the Neuroptera, Megaloptera and Raphidioptera of the world. - Occasional Papers of the California Academy of Sciences 147:1-94.
- RAMBUR, J. P. 1842: Histoire Naturelle des Insectes, Névroptères. - Librairie encyclopédique de Roret. Fain et Thunot, Paris. [xviii]+534 pp.
- SÉLYS-LONGCHAMPS, M. E. de. 1866: Notice sur une nouvelle espèce de Némoptère. - Annales de la Société Entomologique de Belgique 10: 253–255.
- SIMON, D. 1983: The Nemopteridae. - Shapirit 1: 30–37.
- SZIRÁKI, GY. 2011: Order Neuroptera, family Nemopteridae. Arthropod fauna of the UAE 4, 66–71.
- TJEDER, B. 1967: Neuroptera-Planipennia. The Lace-wings of Southern Africa. 6. Family Nemopteridae. In South African Animal Life, B. HANSTRÖM, P. BRINCK and G. RUDEBEC, (Eds.) Vol. 13. Swedish Natural Science Research Council, Stockholm, pp. 290–501.
- TJEDER, B. 1970: A new Lertha from Israel (Neur., Nemopteridae). - Entomologica Scandinavica 1: 219–222.
- YANG, C.-k. 1986: Thirty new species and four new genera of Neuroptera from Yunnan, and the family Nemopteridae new to China. - Acta Agriculturae Universitatis Pekinensis [=Peiching Nung Yeh Ta Hsueh Pao] 12: 153-166, 423-434.
- WALKER, F. 1853: List of the specimens of neuropterous insects in the collection of the British Museum. Part II.--(Sialides--Nemopterides). - British Museum, London, pp. [iii] + 193–476.
- WESTWOOD, J. O. 1841: A monograph on the genus Nematoptera. - Proceedings of the Zoological Society of London 9: 9–14.
- WESTWOOD, J. O. 1874: Thesaurus Entomologicus Oxoniensis; or, illustrations of new, rare, and interesting insects, for the most part contained in the collections presented to the University of Oxford by the Rev. F. W. Hope Clarendon Press, Oxford
- WHITTINGTON, A. E. 2002: Resources in Scottish Neuropterology. In: Gy. SZIRÁKI (Ed.), Neuropterology 2000. Proceedings of the Seventh International Symposium on Neuropterology (6–9 August 2000, Budapest, Hungary). Acta Zoologica Academiae Scientiarum Hungaricae 48 (Suppl. 2): 371–387.

Submitted: 15. 06. 2014

Accepted: 15. 07. 2014

Published: 15. 12. 2014