New data on the hoverflies of Morocco (Diptera, Syrphidae) with faunistic and bibliographical inventories

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Abstract
All published records of 148 species of hoverflies from Morocco are reviewed and appropriate literature references, new locality records, and relevant comments are provided for each species. The list is supplemented with records from new field surveys. Two species, Eumerus obliquus (Fabricius, 1805) and Orthonevra brevicornis Loew, 1843 are recorded for the first time in Morocco. The new checklist comprises 150 nominal species from three subfamilies, 14 tribes, and 49 genera.

Keywords
Checklist, Diptera, hoverflies, Morocco, new records, North Africa, Palearctic region, Syrphidae

Introduction

Syrphidae (Diptera: Brachycera), commonly named hoverflies, constitute, among the order Diptera, a taxonomically well-characterised family. Most adults feed on pollen and nectar and thus are potentially important pollinators and their conservation is essential to sustain the productivity of natural and agricultural landscapes (Moquet et al. 2018). The larvae of Syrphidae have various food habits; certain species are predators while others are phytophagous, mycophagous or saprophytophagous (Rotheray and Gilbert 1999, Rotheray 1993, Büchs 2003).
Hoverflies occur in all geographical regions except for Antarctica and some isolated islands. They are found from sea level to the highest altitudes in flower-rich habitats. The family contains more than 6,100 species worldwide (Pape et al. 2011). Of the North African countries bordering the Mediterranean Sea, Morocco is the one best known faunistically. Since Becker and Stein (1913) published an initial list of 42 species, several authors have contributed to the knowledge of Moroccan Syrphidae (Gil Collado 1929, Séguy 1930, 1934, 1941, 1949, 1953, Kanervo 1939, Claussen 1989, Claussen and Hauser 1990, Hurkmans 1993, Kassebeer 1995, 1998, 1999, 2000, Pârvu et al. 2006, Popović et al. 2015, Acanski et al. 2016, van Steenis et al. 2017, Vujić et al. 2018, Ebejer et al. 2019).

Morocco has the highest number of total Syrphidae species recorded in the North Africa Mediterranean area so far (N = 150). Ninety-one species are reported from Algeria (Peck 1988, Dirickx 1994, Haffaressas et al. 2017), while 69, 51 and 34 species are recorded from Tunisia (Peck 1988, Claussen and Hauser 1990, Dirickx 1994), Egypt (Peck 1988, Dirickx 1994, El-Hawagry and Gilbert 2019) and Libya (Peck 1988, Dirickx 1994), respectively. Below, we provide an annotated checklist of all syrphid species recorded from Morocco.

Altogether 150 species are recorded in this work, two species are newly recorded for Morocco, and 24 others are new records for at least one of the Moroccan regions: Rif (10), Eastern region (4), High Atlas (5), Middle Atlas (5), and Anti Atlas (6). Morocco has 12 endemic species.

**Materials and methods**

Syrphidae were collected from 79 localities across the main regions in Morocco, mostly in the Rif Mountains, including the Eastern region, the High Atlas, Middle Atlas and Anti Atlas. Additional material and databases indicated in the text are provided by other researchers.

Collecting was mainly carried out by sweep netting and Malaise trapping adults and/or rearing larvae and puparia in the laboratory from collected substrates in aquatic ecosystems following the technique used by Afzan and Belqat (2016). The majority of the Moroccan hoverflies were identified from external characteristics, except for some species for which male genital morphology was used to confirm their identity. Identifications were done with specific keys (Verlinden 1991, Kassebeer 1995a, Hauser and Kassebeer 1998, Kassebeer 1998b, Kassebeer 1999b, van Veen 2004, Marcos-García et al. 2007, Speight and Sarthou 2013). Forty-six of the species were identified with the help of Bastiaan Wakkie (Brussels, Belgium).

A total of 690 Syrphidae specimens was collected from 79 Moroccan sites (Table 1, Fig. 1). Maps with collecting localities were created with ArcGIS (Geographic Information System). Literature references on the occurrence in Morocco are given for each species, together with the region of the country from which the species is known. Additional information is given in the section ‘Comments’. The Distribution as it is given
Table 1. Sampling sites (in alphabetical order) with locality names, altitudes (meters), and geographical coordinates (latitude/longitude).

| Station | Locality | Province | Altitude (m) | Geographical coordinates |
|---------|----------|----------|--------------|--------------------------|
| Rif     |          |          |              |                          |
| 1. Ain Afersiw | Mezine | Chefchaouen | 750 | 35°05.945’N, 05°20.439’W |
| 2. Ain Boughaba | Jbel Bou Besouci, Cedar Forest | Chefchaouen | 1530 | 34°58.779’N, 04°46.366’W |
| 3. Ain El Ma Bared | Bouzthate | Chefchaouen | 1270 | 35°00.333’N, 05°12.105’W |
| 4. Ain El Maounzil | National Park of Talassemtane | Chefchaouen | 1110 | 35°04.577’N, 05°10.406’W |
| 5. Ain Quangouben | Jbel Bou Besouci | Chefchaouen | 1600 | 34°57.750’N, 04°40.783’W |
| 6. Ain Takhninjoute | Bab Rouida, National Park of Talassemtane | Chefchaouen | 1510 | 35°06.881’N, 05°08.270’W |
| 7. Ain Sidi Brahim Ben Arrif | Road Moulay Abdessalam | Larache | 900 | 35°20.398’N, 05°32.712’W |
| 8. Belyounech | Jbel Moussa | M'diq Fnideq | 60 | 35°54.389’N, 05°23.632’W |
| 9. Bni Maaden | Bni Maaden | Tétouan | 20 | 35°34.420’N, 05°15.901’W |
| 10. Dam Entrasol | Ouedlaou Bni Ferten | Chefchaouen | 40 | 35°22.015’N, 05°10.626’W |
| 11. Daya El Birdiye | Anasar | Chefchaouen | 1300 | 35°01.089’N, 04°59.477’W |
| 12. Dam Moulay Bouchta | Larbaa Beni Hassan | Tétouan | 360 | 35°15.864’N, 05°21.221’W |
| 13. Dam Nakhl | Zinat | Tétouan | 240 | 35°26.954’N, 05°24.326’W |
| 14. Dam Smir | Bouzaghlale (M’diq) | Tétouan | 1060 | 35°15.596’N, 05°25.917’W |
| 15. Daya Amsemil | Jbel Bouhachem | Tétouan | 1180 | 35°00.788’N/04°57.419’W |
| 16. Daya El Anassar | Bab Berred | Chefchaouen | 220 | 35°45.457’N, 05°22.189’W |
| 17. Daya Jbel Zemzem | Jbel Zemzem | Tétouan | 970 | 35°16.195’N, 05°26.158’W |
| 18. Daya Rahrah | Jbel Bouhachem | Larache | 1250 | 35°15.864’N, 05°21.221’W |
| 19. Daya Rahrah | Tanger | Tanger-Assilah | 60 | 35°46.063’N, 05°51.517’W |
| 20. Daya Tazia | Road Moulay Abdessalam | Larache | 720 | 35°20.814’N, 05°33.139’W |
| 21. Douar Dacheryène | Dacheryène | Tétouan | 130 | 35°33.863’N, 05°27.162’W |
| 22. Douar Kitane | Kitane | Tétouan | 50 | 35°32.412’N, 05°20.393’W |
| 23. Forest Bab El Tamakoute |森林 | Chefchaouen | 1250 | 34°58.510’N, 05°11.838’W |
| 24. Forest El Mahfouara | Zaouia Sidi Kacem, Asma | Tétouan | 800 | 35°27.724’N, 05°25.807’W |
| 25. Forest house | National Park of Talassemtane | Chefchaouen | 1670 | 35°08.076’N, 05°08.262’W |
| 26. Garden Ksar Al Rimal | Kabila | M’diq-Fnideq | 10 | 35°43.806’N, 05°20.509’W |
| 27. Jumb Kitane | Kitane | Tétouan | 40 | 35°32.759’N, 05°20.420’W |
| 28. Halouma Kitane | Kitane | Tétouan | 140 | 35°31.912’N, 05°19.861’W |
| 29. 1 km after Dergara | Tanakoub | Chefchaouen | 510 | 35°06.419’N, 05°17.938’W |
| 30. Ksar El Kébir | Ksar El Kébir | Larache | 25 | 35°00.441’N, 05°53.352’W |
| 31. Meadow Mizoghar | El Khizana | Chefchaouen | 1000 | 35°02.725’N, 05°12.969’W |
| 32. Meadow Fahs | Al Alyiene | M’diq-Fnideq | 590 | 35°44.018’N, 05°26.537’W |
| Lmhar |          |          |              |                          |
| 33. Oued Aârkoub | Aârkoub | Chefchaouen | 140 | 35°15.943’N, 04°50.631’W |
| 34. Oued Achekrane | Dour Aouzighen | Tétouan | 640 | 35°22.931’N, 05°20.364’W |
| 35. Oued Ametrasse | Chrafate | Chefchaouen | 830 | 35°05.014’N, 05°05.130’W |
| 36. Oued Azila | Azila, Jbel Tidghine | Al Hoceïma | 1600 | 34°52.028’N, 04°32.609’W |
| 37. Oued 15 km from Fifi | Bouzthate | Chefchaouen | 1260 | 35°00.805’N, 05°12.365’W |
| 38. Oued Boumarouil | Larbaa Beni Hassan | Tétouan | 550 | 35°18.733’N, 05°21.271’W |
| 39. Oued Bin El Ouidane | Ksar Sghir | Tanger-Assilah | 90 | 35°46.356’N, 05°31.343’W |
| 40. Oued Dergara | Dergara | Chefchaouen | 400 | 35°06.484’N, 05°17.147’W |
| 41. Oued Mharhar | Tanger | Tanger-Assilah | 5 | 35°35.040’N, 05°59.220’W |
| 42. Oued El Koub | Souk El Had | Chefchaouen | 120 | 35°01.298’N, 05°25.333’W |
| Station                  | Locality                  | Province       | Altitude (m) | Geographical coordinates       |
|-------------------------|---------------------------|----------------|--------------|--------------------------------|
| 43. Oued Farda          | Akchour                   | Chefchaouen    | 400          | 35°14.350’N, 05°10.460’W       |
| 44. Oued Jnane Niche    | Jnane Niche               | Chefchaouen    | 40           | 35°17.019’N, 05°12.233’W       |
| 45. Oued Majjou         | Majjou village            | Chefchaouen    | 800          | 35°06.175’N, 05°10.836’W       |
| (Hafa meqlouba)         |                           |                |              |                                |
| 46. Oued Marril         | Mhannech 2                | Tétouan        | 9            | 35°33.693’N, 05°22.510’W       |
| 47. Oued Mezine         | Mezine                    | Chefchaouen    | 780          | 35°06.104’N, 05°21.177’W       |
| 48. Oued Sahel          | Ben Karrich               | Tétouan        | 40           | 35°29.238’N, 05°26.352’W       |
| 49. Oued Sidi Ben       | Derdara                   | Chefchaouen    | 220          | 35°03.921’N, 05°19.895’W       |
| Saâda                   |                           |                |              |                                |
| 50. Oued Sidi Yahya     | Sidi Yahya Aârab          | Chefchaouen    | 60           | 35°17.545’N, 04°53.503’W       |
| Aârab                   |                           |                |              |                                |
| 51. Oued Taïda          | Taïda                     | Larache        | 500          | 35°22.250’N, 05°32.355’W       |
| from Sidi Yahya Aârab   |                           |                |              |                                |
| 52. Stream at 1 km      |                           |                |              |                                |
| 53. Village Sebt Zinate | Village Sebt Zinate       | Tangier-Assilah| 60           | 35°39.272’N, 05°44.071’W       |
| 54. Tributary Oued      | Mezine                    | Chefchaouen    | 730          | 35°05.670’N, 05°21.991’W       |
| Tazarine                |                           |                |              |                                |
| 55. Tributary Tarmast   | National Park of Al Hoceima| Al Hoceima    | 170          | 35°10.666’N, 04°03.088’W       |
| 56. Farm Saf-Saf        | Dour Oued Ben Amrou       | Berkane        | 60           | 34°54.122’N, 02°37.212’W       |
| 57. Oued El Khemis      | Road vers Aklim           | Berkane        | 80           | 34°54.330’N, 02°30.097’W       |
| 58. Oued Tafoughalt     | Tafoughalt, Beni Snassen  | Berkane        | 750          | 34°48.941’N, 02°24.471’W       |
| 59. Ain Ouillili        | Sidi Moulay Zarhoun       | Meknès         | 490          | 34°03.216’N, 05°31.050’W       |
| 60. Bridge Oued Oum     | El Had Labradia           | Fkih Bensalah  | 420          | 32°25.865’N, 06°31.883’W       |
| Er-rabie (Dour Ahl Souss) |                         |                |              |                                |
| 61 Dourar Ben Smim      | Ben Smim                  | Ifrane         | 1690         | 33°28.200’N, 05°09.780’W       |
| 62. Dourar Zaouiat      | Zaouiat Cheikh            | Khénifra       | 700          | 32°39.246’N, 05°54.154’W       |
| Cheikh                  |                           |                |              |                                |
| 63. Oued d’Ifrane       | Gorge of Zad              | Ifrane         | 2140         | 33°01.740’N, 05°04.260’W       |
| 64. Vicinity of Ifrane  | Ifrane                    | Ifrane         | 1660         | 33°32.580’N, 05°09.240’W       |
| 65. Aïn Zarka of Meski  | Madkhal Meski             | Errachidia     | 970          | 31°51.388’N, 04°16.917’W       |
| 66. Agadir airport      | Ikhourbame                | Agadir         | 50           | 30°20.400’N, 09°26.820’W       |
| 67. Dourar Akhlâj Tnine | Ouirka                    | Marrakech      | 870          | 31°22.385’N, 07°46.608’W       |
| Ourika                  |                           |                |              |                                |
| 68. Dourar Aouirir      | Aouirir                   | Agadir         | 200          | 30°28.980’N, 09°38.340’W       |
| 69. Lac Ouâïmeden       | Ouaâmeden                 | Marrakech      | 2590         | 31°12.420’N, 07°51.120’W       |
| 70. Palm grove Igrane   | Merzouga village          | Errachidia     | 710          | 31°08.520’N, 04°01.260’W       |
| 71. Vicinity of Asni    | Asni                      | Marrakech      | 1400         | 31°14.880’N, 08°00.480’W       |
| 72. Vicinity of Ijoukak | Ijoukak                   | Marrakech      | 1790         | 30°56.100’N, 08°38.400’W       |
| 73. Tizi N’Test         | Tizi N’Test               | Taroudante     | 1850         | 30°51.180’N, 08°22.080’W       |
| 74. Beach of Tamellalt  | Tamellalt                 | Tiznit         | 70           | 29°43.080’N, 09°55.020’W       |
| 75. Dourar Issafen      | Issafen                   | Tata           | 1110         | 29°50.460’N, 08°32.100’W       |
| 76. Dourar Zaouia       | Kelâa M’gouna             | Ouarzazate     | 1240         | 31°14.275’N, 06°08.169’W       |
| 77. 1 km before Dourar  | Jbel Ras Tarf             | Guelmim        | 190          | 29°01.320’N, 10°23.100’W       |
| Ain Lahmar              |                           |                |              |                                |
| 78. Msidira             | El Filaha                 | Guelmim        | 260          | 28°56.865’N, 10°02.979’W       |
| 79. Oued Assa           | Assa                      | Assa zag       | 310          | 28°36.507’N, 09°25.800’W       |
Figure 1. Map of Morocco indicating the collecting sites for hoverflies in this study.
for individual species is based on Speight (2018) and Mengual et al. (2020), as the most up-to-date reference, although other published works were consulted for specific taxa in order to obtain a more accurate distribution.

Nomenclature followed Speight (2018) and subfamily classification followed Mengual et al. (2015). Synonyms are given as far as they have been used in the literature dealing with the Moroccan fauna. All the specimens collected in this study are deposited in the collection of Diptera of the Department of Biology, Faculty of Sciences, University Abdelmalek Essaâdi, Tétouan.

Results

Subfamily SYRPHINAE Latreille, 1802
Tribe MELANOSTOMINI Williston, 1885
Genus MELANOSTOMA Schiner, 1860

Melanostoma mellinum (Linnaeus, 1758)

Literature records. Rif (Becker and Stein 1913: 88, Gil Collado 1929: 405, Kanervo 1939: 2–3). Central Plateau (Séguy 1934: 162). Middle Atlas (Kanervo 1939, Timon-David 1951: 145, Leclercq 1961: 241, Claussen and Hauser 1990: 435). High Atlas (Kanervo 1939, Timon-David 1951, Claussen 1989b: 359, 373, Claussen and Hauser 1990). Distribution map Dirickx (1994: 76, 218).

New sites. Rif: Daya Rahrah, 8/IV/2013, 4♂♂; Aïn El Ma Bared, 06/V/2013, 4♀♀, 06/V/2014, 2♂♂; Oued Derdara, 24/V/2013, 1♀; Daya El Ànassar, 24/V/2013, 1♂; Daya Mtahen, 30/V/2013, 1♂; Garden Ksar Al Rimal, 26/V/2013, 7♂♂, 17♀♀, 5/VI/2013, 1♀; Tributary Oued Tazarine, 11/VI/2013, 1♂; Oued Farda, 23/VI/2013, 1♂; Daya El Birdiyel, 27/VI/2013, 1♀; Forest house, 18/V/2014, 1♂, 1♀; Stream at 1 km from Sidi Yahya Àarab, 25/IV/2015, 1♂; Daya Amsemil, 7/V/2015, 3♀♀, sweep net, leg. Sahib and Belqat. Eastern region: Farm Saf-Saf, 14/VI/2013, 3♂♂, 21♀♀, sweep net, leg. Sahib and Belqat. Middle Atlas: Oued d’Ifrane, 10/VI/2014, 4♂♂, sweep net, leg. Bot. High Atlas: Lac Oukaïmeden, 18/VI/2014, 1♂, 1♀, sweep net, leg. Bot.

Distribution. Holarctic.

Comment. New record for the Eastern Region.

Melanostoma scalare (Fabricius, 1794)

Literature records. Rif (Gil Collado 1929: 405). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 76, 219).

New sites. Rif: Aïn El Ma Bared, 06/V/2013, 11♀♀; Oued Mezine, 11/VI/2013, 1♀; Aïn Quanquben, 27/VI/2013, 6♀♀; Aïn Takhninjoute, 17/V/2014, 1♂; Oued El Koub, 30/V/2014, 1♀, sweep net, leg. Sahib and Belqat.

Distribution. Palaearctic, Afrotropical, and Indomalayan regions.
Genus *PLATYCHEIRUS* Le Peletier and Serville, 1828

*Platycheirus ambiguus* (Fallén, 1817)

Literature record. High Atlas (Kassebeer 1998b: 27).
Distribution. Palaearctic.

*Platycheirus atlasi* Kassebeer, 1998

Literature records. Middle Atlas (Kassebeer 1998b: 28). High Atlas (Kassebeer 1998b: 28).
Comment. Endemic to Morocco.
Distribution. Morocco.

*Platycheirus fulviventris* (Macquart, 1829)

Literature record. High Atlas (Ebejer et al. 2019: 150).
Distribution. Palaearctic.

*Platycheirus manicatus* (Meigen, 1822)

Literature records. High Atlas (Séguy 1961: 74). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 111, 268).
Distribution. Palaearctic, Greenland, and Alaska.

*Platycheirus marokkanus* Kassebeer, 1998

Literature record. High Atlas, Middle Atlas (Kassebeer 1998b: 31). Cited (Speight 2018: 209).
New site. Rif: Aïn Takhninjoute, 17/V/2014, 1♂. High Atlas: Douar Akhlij Tnine Ourika 18/IV/2015, 1♂, sweep net, leg. Sahib and Belqat.
Comment. New record for the Rif.
Distribution. Morocco and Portugal.

Genus *XANTHANDRUS* Verrall, 1901

*Xanthandrus comtus* (Harris, 1780)

Literature records. Rif (Gil Collado 1929: 405). Listed (Claussen 1989b: 374). Distribution map (Dirickx 1994: 128, 290).
Distribution. Palaearctic.
Tribe PARAGINI Glumac, 1961
Genus PARAGUS Latreille, 1804

Paragus albifrons (Fallén, 1817)

**Literature records.** Middle Atlas (Kanervo 1939: 2). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 98, 249).

**Distribution.** Palaearctic.

Paragus atlasi Claussen, 1989

**Literature records.** High Atlas (Claussen 1989b: 359–361). Cited (Dirickx 1994: 99, Speight 2018: 175).

**Comment.** Endemic to Morocco.

**Distribution.** Morocco.

Paragus bicolor (Fabricius, 1794)

**Literature records.** Rif (Becker and Stein 1913: 88). Central Plateau (Kanervo 1939: 2). Middle Atlas (Séguy 1930: 128, Kanervo 1939, Timon-David 1951: 144, Claussen 1989, Claussen and Hauser 1990). High Atlas (Kanervo 1939, Claussen 1989b: 361, 373, Claussen and Hauser 1990: 435). Anti Atlas (Séguy 1949: 156). Distribution map (Dirickx 1994: 98, 250).

**New sites.** Rif: Douar Dacheryène, 4/IV/2014, 1♀, sweep net, leg. Sahib and Belqat. High Atlas: Vicinity of Asni, 05/VI/2014, 1♀, sweep net, leg. Bot.

**Distribution.** Holarctic.

Paragus cinctus Schiner and Egger, 1853

**Literature records.** High Atlas (Claussen 1989b: 361, 373). Cited (Speight 2018: 176). Distribution map (Dirickx 1994: 99, 250).

**New site.** High Atlas: Vicinity of Asni, 05/VI/2014, 1♂, sweep net, leg. Bot.

**Distribution.** Western and Central Palaearctic.

Paragus coadunatus Rondani, 1847

**Literature records.** Middle Atlas (Claussen and Hauser 1990: 436). Cited (Speight 2018: 176). Distribution map (Dirickx 1994: 99, 251).

**New site.** Rif: Oued Mharhar, 16/VI/2009, 1♂, sweep net, leg. Bot.

**Comment.** New record from the Rif.

**Distribution.** Balearic Is, Canary Is, Sicily, Malta, Madeira, Turkey, and Morocco.
Paragus flammaeus Goeldlin, 1971

**Literature records.** Middle Atlas (Claussen and Hauser 1990: 435). Cited (Speight 2018: 178). Distribution map (Dirickx 1994: 100, 252).

**Distribution.** Western and Central Palaeartic.

Paragus haemorrhous Meigen, 1822

**Literature records.** Recorded and listed from the Middle Atlas (Claussen 1989b: 359, 372). Distribution map (Dirickx 1994: 100, 252).

**Distribution.** Holarctic and Afrotropical regions.

Paragus hermonensis Kaplan, 1981

**Literature record.** Middle Atlas (Claussen 1989b: 361, 373). Distribution map (Dirickx 1994: 100, 101, 252).

**Distribution.** Mediterranean Basin.

Paragus pecchiolii Rondani, 1857

**Literature records.** Middle Atlas (Claussen and Hauser 1990: 435). Distribution map (Dirickx 1994: 101, 253).

**Distribution.** Western Palaeartic.

Paragus quadrifasciatus Meigen, 1822

**Literature records.** Central Plateau (Claussen 1989b: 361, 373). Middle Atlas (Claussen and Hauser 1990: 435, Timon-David 1951: 144, as Paragus pulcherrimus). Distribution map (Dirickx 1994: 101, 253).

**New sites.** Rif: Douar Kitane, 19/VI/2014, 1♀, sweep net, leg. Sahib and Belqat. High Atlas: Agadir airport, 7/IV/2015, 1♀, leg. Schmid-Egger.

**Comment.** New record from the Rif and the High Atlas.

**Distribution.** Palaeartic.

Paragus strigatus Meigen, 1822

**Literature records.** Central Plateau (Wiedemann 1824: 33, as Paragus bimaculatus). Middle Atlas (Claussen 1989b: 361, 373, Claussen and Hauser 1990: 435). High Atlas (Claussen 1989b: 361, 373). Cited (Speight 2018: 181). Distribution map (Dirickx 1994: 102, 254).

**Distribution.** Palaeartic.
**Paragus tibialis** (Fallén, 1817)

**Literature records.** Rif (Becker and Stein 1913: 88, Leclercq 1961: 241, as *Paragus tibialis meridionalis*). Middle Atlas (Kanervo 1939: 2, Leclercq 1961: 241). High Atlas (Gil Collado 1929: 403, 404 (as *Paragus tibialis var. meridionalis*), Kanervo 1939: 2). Anti Atlas (Séguy 1949: 156). Listed (Claussen 1989b: 359, 373). Distribution map (Dirickx 1994: 102, 254).

**New sites.** High Atlas: Vicinity of Asni, 05/VI/2014, 1♂, 07/VI/2014, 2♂♂; Vicinity of Ijoukak, 17/VI/2014, 1♂, sweep net, leg. Bot.

**Distribution.** Western Palaearctic.

**Paragus vandergooti** Marcos-Garcia, 1986

**Literature records.** Middle Atlas (Claussen and Hauser 1990: 435). High Atlas (Claussen 1989b: 362, 373). Cited (Speight 2018: 181). Distribution map (Dirickx 1994: 102, 255).

**Distribution.** France, Portugal, Spain, and Morocco.

**Tribe CHRYSTOTOXINI** Newman, 1834

**Genus CHRYSTOTOXUM** Meigen, 1803

**Chrysotoxum intermedium** (Meigen, 1822)

**Literature records.** Rif (Becker and Stein 1913: 86, Gil Collado 1929: 414). Central Plateau (Părvu et al. 2006: 275). Middle Atlas (Séguy 1930: 131, 1961: 120). High Atlas (Séguy 1930: 131, Kanervo 1939: 4, Gil Collado 1929: 414). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 47, 178).

**New sites.** Rif: 1 km after Derdara, 11/VI/2013, 1♀; Oued Azila, 27/VI/2013, 1♂; Daya Jbel Zemzem, 23/IV/2014, 1♂; Ain El Maounzil, 17/V/2014, 1♀, sweep net, leg. Sahib and Belqat. Eastern region: Oued Tafoughalt, 25/XI/2014, 1♂, sweep net, leg. Sahib and Belqat. Middle Atlas: Douar Zaouiat Cheikh, 19/III/2008, 2♂♀, 1♂, sweep net, leg. A. van Eck. High Atlas: Vicinity of Asni, 6/VI/2014, 2♀♀, sweep net, leg. Bot. Anti Atlas: Douar Issafen, 14/VI/2015, 3♀♂, 1♂, sweep net, leg. Schmid-Egger.

**Comment.** New record from the Eastern region and the Anti Atlas.

**Distribution.** Europe and Morocco.

**Chrysotoxum volaticum** Séguy, 1961

**Literature records.** Middle Atlas (Timon-David 1951: 146, Leclercq 1961: 242, Séguy 1961: 123). High Atlas (Timon-David 1951, Claussen 1989b: 357, 372). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 46, 49, 175, 181).

**Distribution.** Algeria and Morocco.
Tribe SYRPHINI Latreille, 1802
Genus DASYSYRPHUS Enderlein, 1838

Dasysyrphus albostriatus (Fallén, 1817)

Literature record. High Atlas (Kassebeer 1998a: 22).
Distribution. Palaearctic.

Genus EPISTROPHE Walker, 1852

Epistrophe eligans (Harris, 1780)

Literature records. Rif (Becker and Stein 1913: 88, as Syrphus ochrostoma). Middle Atlas (Kassebeer 1998a: 22). High Atlas (Kassebeer 1998a: 22). Listed (Claussen 1989b: 372, as Epistrophe ochrostoma).
New site. Rif: Daya Tazia, 25/VI/2014, 1♂, sweep net, leg. Sahib and Belqat.
Distribution. Western Palaearctic.

Genus EPISYRPHUS Matsumura and Adachi, 1917

Episyrphus balteatus (De Geer, 1776)

Literature records. Rif (Becker and Stein 1913: 88, as Syrphus balteatus, Gil Collado 1929: 406, Kanervo 1939: 3, as Epistrophe balteata). Central Plateau (Séguy 1930: 129, as Syrphus balteatus, Timon-David 1951: 144, as Epistrophe balteata). High Atlas (Séguy 1930, Timon-David 1951). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 53, 189).
New sites. Rif: Village Sebt Zinate, 15/III/2008, 1♀, sweep net, leg. AvEck; Ain Sidi Brahime Ben Arrif, 17/IV/2013, 1♂; Dam Nakhla, 24/V/2013, 1♂, 1♀; Ain Boughaba, 24/V/2013, 1♀; Garden Ksar Al Rimal, 5/VI/2013, 1♀; Oued Aârkoub, 19/IV/2013, 4♀♀; Daya Rahrah, 2/XII/2013, 1♂, 1♀; Oued Sahel, 5/III/2014, 1♀; Dam Moulay Bouchta, 5/III/2014, 26♀♀; Forest house, 17/VI/2014, 1♂; Ksar El Kébir, 19/IV/2014, 1♂, 1♀; Daya Jbel Zemzem, 23/IV/2014, 13♀♀, 27/IV/2014, 1♀; Oued Taïda, 12/III/2015, 1♀; Stream at 1 km from Sidi Yahya Aârab, 25/IV/2015, 1♂; Ain Quanquben, 25/IV/2015, 1♀; Oued Majjou (Hafa meqloba), 25/XII/2015, 1♀; Forest Bab El Karne, 25/XII/2015, 1♂; Douar Kitane, 23/II/2016, 2♀♀, 1♂, sweep net, leg. Sahib and Belqat; Douar Kitane, 7/IV/2017, 54♀♀, 14♀♀, malaise trap, leg. Sahib and Belqat; Forest El Mahfoura, 13/V/2018, 18♀♀, 4♀♀, sweep net, leg. Sahib and Belqat. High Atlas: Ain Zarka of Meski, 20/III/2008, 1♂, sweep net, leg. A. van Eck. Anti Atlas: Douar Zouinia, 11/VI/2015, 1♂, sweep net, leg. Sahib and Belqat.
Distribution. Palaearctic and Indomalayan regions.
Genus **EUPEODES** Osten Sacken, 1877

**Eupeodes corollae** (Fabricius, 1794)

**Literature records.** Rif (Becker and Stein 1913: 88, as *Syrphus corollae*, Kanervo 1939: 3, as *Syrphus corollae*, Gil Collado 1929: 406, as *Syrphus corollae*). Central Plateau (Timon David 1951: 144, as *Syrphus corollae*, Gil Collado 1929: 406). Middle Atlas (Leclercq 1961: 241, as *Syrphus corollae*). High Atlas (Séguy 1930, Timon-David 1951). Anti Atlas (Timon David 1951). Listed (Bigot 1884: 88, as *Syrphus berber*, Séguy 1930: 129, 1961: 103, Claussen 1989b: 372). Distribution map (Dirickx 1994: 89, 235 (as *Metasyrphus corollae*)).

**New site.** Rif: Village Sebt Zinate, 15/III/2008, 1 ♀, sweep net leg. AvEck; Aïn El Ma Bared, 27/IV/2013, 1 ♀; Garden Ksar Al Rimal, 20/V/2013, 1 ♀; Oued Bin EL Ouidane, 14/XI/2013, 1 ♀; Oued Sahel, 5/III/2014, 1 ♂; Aïn Takhninjoute, 17/IV/2014, 31 ♂♂; Stream at 1 km from Sidi Yahya Aârab, 25/IV/2015, 2♂♀, 3 ♀♀; Oued Jnane Niche, 16/III/2014, 1 ♂, 25/IV/2015, 1 ♂, 1 ♀; Dam Smir, 27/IV/2014, 1 ♂; Oued Boumarouil, 10/V/2014, 1 ♂; Daya Jbel Zemzem, 23/IV/2014, 1 ♂, 3 ♀♀, 17/IV/2014, 6♂♂, 3 ♀♀; Oued Majjou (Hafa meqlouba), 10/V/2014, 1 ♂, 27/IV/2015, 1 ♂; Meadow Fahs Lmhar, 15/IV/2018, 1 ♀, sweep net, leg. Sahib and Belqat. Douar Kitane, 21/IV/2018, 1 ♂, reared by Sahib and Belqat; Forest El Mahfoura, 13/V/2018, 12♂♂, 7 ♀♀, sweep net, leg. Sahib and Belqat. Middle Atlas: Douar Zaouiat Cheikh, 19/III/2008, 1 ♀, sweep net, leg. A. van Eck. High Atlas: Vicinity of Asni, 6/VI/2014, 1 ♀; Vicinity of Ijoukak, 17/VI/2014, 1 ♀, sweep net, leg. Bot; Lac Oukaïmeden, 18/VI/2014, 1 ♂, sweep net, leg. Bot.

**Distribution.** Palaearctic, Afrotropical Region, and Taiwan.

**Eupeodes latifasciatus** (Macquart, 1829)

**Literature records.** Anti Atlas (Séguy 1949: 156, Séguy 1953: 84, as *Syrphus latifasciatus*). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 89, 236 (as *Metasyrphus latifasciatus*)).

**New sites.** Rif: Douar Kitane, 2/V/2014, 1 ♂, 2 ♀♀; Forest house, 18/V/2014, 1 ♂; Oued Ametrasse, 27/IV/2015, 1 ♂, sweep net, leg. Sahib and Belqat.

**Comment.** New record for the Rif.

**Distribution.** Holarctic and India.

**Eupeodes luniger** (Meigen, 1822)

**Literature records.** Central Plateau (Gil Collado 1929: 406, as *Syrphus luniger*). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 90, 237 (as *Metasyrphus luniger*)).

**New sites.** Rif: Oued Majjou (Hafa meqlouba), 10/V/2014, 3♂♂; Oued Martil, 13/XII/2013, 1 ♀; Belyounech, 9/VI/2013, 1 ♀, sweep net, leg. Sahib and Belqat; Douar Kitane, 24/IV/2017, 1 ♀, malaise trap, leg. Sahib and Belqat. Middle Atlas:
New data on the Syrphidae of Morocco, Faunistic & bibliographical inventory

Douar Ben Smim, 08/VI/2014, 1♂, sweep net, leg. Bot. High Atlas: Vicinity of Asni, 6/VI/2014, 1♀, sweep net, leg. Bot.

Comments. New records from the Rif, the Middle Atlas and the High Atlas.

Distribution. Palaearctic and northern India.

Eupeodes nuba (Wiedemann, 1830)

Literature records. High Atlas (Claussen 1989b: 359, 372). Cited (Bigot 1884: 88, as Syrphus rufinasutus, Séguy 1961: 107, as Syrphus rufinasutus, Speight 2018: 108). Distribution map (Dirickx 1994: 90, 238 (as Metasyrphus nuba)).

Distribution. Palaearctic.

Genus ISCHIODON Sack, 1913

Ischiodon aegyptius (Wiedemann, 1830)

Literature records. Central Plateau (Gil Collado 1929: 406, Timon-David 1951: 145). Anti Atlas (Timon-David 1951).

Distribution. Afrotropical Region, Mediterranean Basin, and Canary Islands.

Genus LAPPWAYSYRPHUS Dusek and Laska 1967

Lapposyrphus lapponicus (Zetterstedt, 1838)

Literature records. Rif (Becker and Stein 1913: 88, as Syrphus arcuatus). Listed (Claussen 1989b: 372, as Eupeodes lapponicus). Distribution map (Dirickx 1994: 89, 236 (as Metasyrphus lapponicus)).

Distribution. Palaearctic, northern America from Alaska to California.

Genus MELISCEVA Frey, 1946

Meliscaeva auricollis (Meigen, 1822)

Literature records. Rif (Becker and Stein 1913: 89, as Syrphus auricollis, Gil Collado 1929: 406, as Syrphus auricollis). Central Plateau (Timon-David 1951: 145, as Epistrophe auricollis). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 76, 219).

New sites. Rif: Aïn El Ma Bared, 27/IV/2013, 1♀; Daya El Ânassar, 24/V/2013, 1♂; Belyounech, 9/VI/2013, 1♀; Oued Mezine, 11/VI/2013, 1♂; Dam Moulay Bouchra, 5/IV/2014, 1♀; Aïn Afersiw, 11/VI/2013, 3♂♂, 7♀♀; Dam Entrasol, 14/XI/2014, 1♀; Oued 15 km from Fifi, 6/V/2014, 1♀; Jumb Kitane, 10/III/2015, 1♀; Oued Majjou (Hafa meqlouba), 10/V/2014, 1♂; Douar Kitane, 2/II/2015, 1♂; Oued Sahel, 5/IV/2014, 1♂. Middle Atlas: Aïn Ouilili, 18/II/2016, 2♀♀, sweep net, leg. Sahib and Belqat.
Comment. New record for the Middle Atlas.

Distribution. Western Palaearctic.

\textit{Meliscaeva cinctella} (Zetterstedt, 1843)

Literature records. Middle Atlas (Séguy 1934: 161, as \textit{Syrphus cinctellus}). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 77, 219).

Distribution. Holarctic.

Genus \textit{SCAEVA} Fabricius, 1805

\textit{Scaeva albomaculata} (Macquart, 1842)

Literature records. Rif (Gil Collado 1929: 405, as \textit{Lasiopticus albomaculata}). Central Plateau (Timon-David 1951: 145, as \textit{Lasiopticus albomaculata}). Middle Atlas (Leclercq 1961: 241, Claussen 1989b: 359). Listed (Séguy 1961: 94, Claussen 1989b: 373). Cited (Speight 2018: 225). Distribution map (Dirickx 1994: 115, 275).

New sites. Rif: Belyounech, 9/VI/2013, 1 ♂, sweep net, leg. Sahib and Belqat. High Atlas: Aïn Zarka of Meski, 20/III/2008, 1 ♀, sweep net, leg. AvEck; Lac Oukaïmeden, 19/VI/2014, 1 ♀, sweep net, leg. Bot.

Comment. New records for the High Atlas.

Distribution. Palaearctic.

\textit{Scaeva dignota} (Rondani, 1857)

Literature records. Middle Atlas (Claussen and Hauser 1990: 436). Distribution map (Dirickx 1994: 116, 275).

New sites. Rif: Oued Majjou (Hafa meqlouba), 27/IV/2015, 1 ♀; Daya Mtahen, 26/III/2016, 1 ♂, sweep net, leg. Sahib and Belqat.

Comment. New records for the Rif.

Distribution. Western Palaearctic.

\textit{Scaeva mecogramma} (Bigot, 1860)

Literature records. Rif (Kassebeer1998a: 23). Middle Atlas (Kassebeer1998a: 23). High Atlas (Kassebeer1998a: 23).

Distribution. Spain, Southern France, Corsica, Italy, Switzerland, and Morocco.

\textit{Scaeva pyrastri} (Linnaeus, 1758)

Literature records. Rif (Becker and Stein 1913: 88, as \textit{Catabomba pyrastri}, Gil Collado 1929: 405). Central Plateau (Gil Collado 1929: 405, as \textit{Lasiopticus pyrastri}, Timon-David 1951: 145, as \textit{Lasiopticus pyrastri}). Middle Atlas (Séguy 1930: 128,
as *Lasiopticus pyrastri*, Timon-David 1951: 145). Listed (Claussen 1989b: 373).
Distribution map (Dirickx 1994: 116, 276).

**New sites.** Rif: Daya Jbel Zemzem, 23/IV/2014, 1 ♀; Stream at 1 km from Oued Sidi Yahya Aârab, 25/IV/2015, 1 ♀, sweep net, leg. Sahib and Belqat. Anti Atlas: 1 km before Douar Aïn Lahmar, 10/IV/2015, 1 ♀, sweep net, leg. Schmid-Egger.

**Comment.** New record for the Anti Atlas.

**Distribution.** Holarctic and India.

### Scaeva selenitica (Meigen, 1822)

**Literature records.** High Atlas (Séguy 1930: 128, as *Lasiopticus selenitica*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 116, 276).

**Distribution.** Palaearctic.

### Genus SPHAEROPHORIA Lepeletier and Serville, 1828

**Sphaerophoria interrupta** (Fabricius, 1805)

**Literature records.** Rif (Becker and Stein 1913: 87, as *Sphaerophoria menthastri*, Kanervo 1939: 3). Central Plateau (Kanervo 1939: 3, as *Sphaerophoria menthastri*, Timon-David 1951: 145, as *Sphaerophoria menthastri*). Middle Atlas (Kanervo 1939, Timon-David 1951). High Atlas (Kanervo 1939). Anti Atlas (Timon-David 1951). Cited (Séguy 1961: 109, as *Sphaerophoria menthastri*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 118).

**Comment.** *S. interrupta* records in Morocco need confirmation.

**Distribution.** Western Palaearctic and Siberia.

**Sphaerophoria ruppelli** (Wiedemann, 1830)

**Literature records.** Rif (Kanervo 1939: 4). Central Plateau (Timon-David 1951: 145, Kanervo 1939). High Atlas (Kanervo 1939, Timon-David 1951, Claussen 1989b). Anti Atlas (Timon-David 1951). Cited (Séguy 1961: 110). Listed (Claussen 1989b: 359, 373). Distribution map (Dirickx 1994: 119, 278).

**New sites.** Rif: Tributary Tarmast, 26/VI/2013, 1 ♂; Oued Sidi Ben Sâada, 6/V/2015, 2 ♂♂; Daya Amsemlil, 7/V/2015, 1 ♂. Eastern region: Farm Saf-Saf, 14/VI/2013, 4 ♂♂, sweep net, leg. Sahib and Belqat. Middle Atlas: Oued d’Ifrane: 10/VI/2014, 1 ♂, sweep net, leg. Bot.

**Comment.** New records for the Eastern region and the Middle Atlas.

**Distribution.** Palaearctic and Afrotropical regions.

### Sphaerophoria scripta (Linnaeus, 1758)

**Literature records.** Rif (Becker and Stein 1913: 87, Gil Collado 1929: 406, Kanervo 1939: 4). Central Plateau (Kanervo 1939, Timon-David 1951: 145). Middle Atlas
(Séguy 1930: 129, Kanervo 1939, Timon-David 1951, Leclercq 1961: 241, Claussen 1989). High Atlas (Kanervo 1939, Claussen 1989b: 359). Listed (Claussen 1989b: 359, 373). Distribution map (Dirickx 1994: 119, 278).

**New sites.** Rif: Oued Aârkoub, 19/IV/2013, 1♂; Dam Nakhla, 25/IV/2013, 1♀; Meadow Mizoghar, 27/IV/2013, 1♂, 1♀; Oued Derdara, 24/V/2013, 3♀♀; 1 km after Derdara, 11/VI/2013, 1♂, 1♀; Daya El Birdiyel, 27/VI/2013, 8♀♀, sweep net, leg. Sahib and Belqat; Palm grove Igrane, 12/VI/2014, 2♂♂, sweep net, leg. Bot; Aïn Quan-quesmen, 27/VI/2013, 7♂♂, 7♀♀; Forest house, 18/VI/2014, 1♂; Oued Sidi Ben Sâada, 6/V/2015, 1♂, 1♀; Daya Mtahen, 7/V/2015, 1♂; Daya Amsemli, 7/V/2015, 1♂, 1♀; Forest El Mahfouara, 13/V/2018, 2♂♂, sweep net, leg. Sahib and Belqat. Eastern region: Farm Saf-Saf, 14/VI/2013, 47♂♂, 53♀♀, sweep net, leg. Sahib and Belqat. Middle Atlas: Oued d’Ifrane, 10/VI/2014, 2♂♂, sweep net, leg. Bot. High Atlas: Vicinity of Asni, 07/VI/2014, 2♂♂, sweep net, leg. Bot; Lac Oukaïmeden, 18/VI/2014, 1♂, sweep net, leg. Bot. Anti Atlas: Msidira, 18/V/2015, 1♂, 2♀♀, sweep net, leg. Sahib and Belqat.

**Comment.** New records for the Eastern region and the Anti Atlas.

**Distribution.** Palaearctic, Greenland, Nepal, and Kashmir.

**Sphaerophoria taeniata** (Meigen, 1822)

**Literature records.** Central Plateau (Timon-David 1951: 10, as *Sphaerophoria menthastri var. taeniata*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 119, 279).

**Distribution.** Palaearctic.

**Genus SYRPHUS** Fabricius, 1775

**Syrphus ribesii** (Linnaeus, 1758)

**Literature records.** Rif (Kassebeer 1998a: 23).

**New site.** Rif: Douar Kitane, 30/I/2014, 1♀, sweep net, leg. Sahib and Belqat.

**Distribution.** Holarctic.

**Syrphus vitripennis** Meigen, 1822

**Literature records.** Rif (Gil Collado 1929: 406). Listed (Claussen 1989b: 374). Distribution map (Dirickx 1994: 125, 286).

**Distribution.** Palaearctic, western North America, and Taiwan.

**Genus XANTHOGRAMMA** Schiner, 1860

**Xanthogramma dives** (Rondani, 1857)

**Literature record.** High Atlas (Ebejer et al. 2019)

**Distribution.** Europe and Morocco.
**Xanthogramma evanescens** Becker, 1913

**Literature records.** Rif (Becker and Stein 1913: 87). Listed (Claussen 1989b: 374). Distribution map (Dirickx 1994: 128).

**Comment.** Endemic to Morocco.

**Distribution.** Morocco.

**Xanthogramma marginale** (Loew, 1854)

**Literature records.** Rif (Becker and Stein 1913: 86, as *Xanthogramma marginale var. morenae*), Gil Collado 1929: 406, as *Xanthogramma marginale var. morenae*), Kanervo 1939: 4). High Atlas (Kanervo 1939). Middle Atlas (Claussen and Hauser 1990: 436). Cited (Séguy 1961: 113, Speight 2018: 258). Listed (Claussen 1989b: 374). Distribution map (Dirickx 1994: 129, 291).

**New sites.** Rif: Village Sebt Zinate, 15/III/2008, 1♀, sweep net, leg. AvEck; Oued Majjou (Hafa meqlouba), 10/V/2014, 1♂; Oued Ametrasse, 18/IV/2015, 1♂, sweep net, leg. Sahib and Belqat; Douar Kitane, 7/IV/2017, 1♂, malaise trap, leg. Sahib and Belqat.

**Distribution.** Western part of the Mediterranean Basin.

**Xanthogramma pedissequum** (Harris, 1776)

**Literature records.** Rif (Gil Collado 1929: 406, as *Xanthogramma ornatum*). Listed (Claussen 1989b: 374). Distribution map (Dirickx 1994: 129, 292).

**Comment.** *X. pedissequum* records in Morocco need confirmation.

**Distribution.** Europe and Morocco.

**Subfamily ERISTALINAE** Rondani, 1845

**Tribe CALLICERINI** Brues and Melander, 1932

**Genus CALLICERA** Panzer, 1806

**Callicera fagesii** Guérin-Méneville, 1844

**Literature record.** High Atlas (Kassebber 1998a: 22).

**Distribution.** Europe and Morocco.

**Callicera rufa** Schummel, 1842

**Literature records.** Rif (Gil Collado 1929: 414). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 23, 139).

**Distribution.** Western Palaearctic.
Tribe CERIOIDINI Wahlgren, 1909  
Genus CERIANA Rafinesque, 1815  

*Ceriana conopsoides* (Linnaeus, 1758)  

**Literature records.** Middle Atlas (Séguy 1930: 131, as *Cerioides conopsoides*). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 23, 140).  

**Distribution.** Palaearctic.  

*Ceriana vespiformis* (Latreille, 1804)  

**Literature records.** Rif (Becker and Stein 1913: 88, as *Cerioides vespiformis*, Gil Collado 1929: 414). Central Plateau (Séguy 1930: 131, as *Cerioides vespiformis*, Leclercq 1961). Middle Atlas (Séguy 1930, Kanervo 1939: 5, Leclercq 1961: 242, as *Cerioides vespiformis*). High Atlas (Gil Collado 1929, as *Cerioides vespiformis*, Kanervo 1939, Claussen 1989b: 365, 372). Cited (Séguy 1961: 210, Speight 2018: 21). Distribution map (Dirickx 1994: 23, 140).  

**New sites.** Rif: 1 km after Derdara, 11/VI/2013, 1♂; Meadow Mizoghar, 6/V/2014, 1♂; Oued Achekrade, 31/V/2014, 1♂, sweep net, leg. Sahib and Belqat.  

**Distribution.** Western Palaearctic.  

Tribe CHEILOSINI Williston, 1885  
Genus CHEILOSIA Meigen, 1822  

*Cheilosia brunnipennis* Becker, 1894  

**Literature records.** High Atlas (Kanervo 1939: 2, as *Chilosia flavipes*, Kassebeer 1998c: 58, 59). Cited (Séguy 1961: 38, 39, Speight 2018: 29). Listed (Claussen 1989b: 372, as *Cheilosia flavipes*).  

**Distribution.** Western Palaearctic.  

*Cheilosia grossa* (Fallén, 1817)  

**Literature record.** Hight Atlas (Kassebeer 1998c: 59). Cited (Speight 2018: 35).  

**Distribution.** Palaearctic and India.  

*Cheilosia latifrons* (Zetterstedt, 1843)  

**Literature records.** Rif (Becker 1894: 395, as *Chilosia marokkana*, Becker and Stein 1913: 87, as *Chilosia maroccana*, Gil Collado 1929: 405, Kassebeer 1998c: 60). Middle Atlas, High Atlas (Kassebeer 1998c). Central Plateau (Timon-David 1951: 144, as *Chilosia intonsa*). Cited (Séguy 1961: 43, as *Chilosia maroccana*). Listed (Claussen 1989b: 372, as *Cheilosia maroccana*). Distribution map (Dirickx 1994: 34, 36, 159).
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New site. Rif: Oued Sidi Yahya Aârab, 25/IV/2015, 1♂, sweep net, leg. Sahib and Belqat.

Distribution. Palaearctic.

Cheilosis paralobi Malski, 1962

Literature records. Rif (Gil Collado 1929: 405, as Cheilosis longula). Middle Atlas (Claussen 1989b, Claussen and Hauser 1990: 436, Kassebeer 1998c: 61). High Atlas (Kassebeer 1998c: 61). Listed (Claussen 1989b: 372). Cited (Speight 2018: 44). Distribution map (Dirickx 1994: 38, 163).

Distribution. Portugal, Spain, Algeria and Morocco.

Cheilosis parva Kassebeer, 1998

Literature record. Middle Atlas (Kassebeer 1998c: 62).

Comment. Endemic to Morocco.

Distribution. Morocco.

Cheilosis rodgersi Wainwright, 1911

Literature records. Rif (Becker and Stein 1913: 88, Claussen 1989a: 283, Claussen 1989b: 372). Listed (Claussen 1989b: 372). Cited (Speight 2018: 48). Distribution map (Dirickx 1994: 40, 166).

Distribution. Portugal, southern Spain, and Morocco.

Cheilosis rufipes (Zetterstedt, 1843)

Literature records. Middle Atlas (Claussen and Hauser 1990: 436 as Cheilosis soror, Kassebeer 1998c: 65, as Cheilosis rufipes). Distribution map (Dirickx 1994: 42, 169).

Distribution. Palaearctic.

Cheilosis scutellata (Fallén, 1817)

Literature records. Rif (Gil Collado 1929: 405, Kassebeer 1998c: 65). Middle Atlas (Kassebeer 1998c: 65). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 42, 169).

Distribution. Palaearctic.

Cheilosis variabilis (Panzer, 1798)

Literature record. Middle Atlas (Kassebeer 1998c: 65). Cited (Speight 2018: 52).

Distribution. Palaearctic.
Genus *FERDINANDEA* Rondani, 1844

*Ferdinandea fumipennis* Kassebeer, 1999

**Literature records.** Middle Atlas (Kassebeer 1999c: 153–162). High Atlas (Kassebeer 1999c). Cited (Speight 2018: 110).

**Distribution.** Portugal, Spain, France, Tunisia, and Morocco.

Tribe CHRYSOGASTERINI Shannon, 1922

Genus *BRACHYOPA* Meigen, 1822

*Brachyopa atlantea* Kassebeer, 2000

**Literature record.** High Atlas (Kassebeer 2000: 141–148). Cited (Speight 2018: 9).

**Distribution.** Southern Spain and Morocco.

Genus *CHRYSOGASTER* Meigen, 1803

*Chrysogaster basalis* Loew, 1857

**Literature records.** Middle Atlas (Claussen and Hauser 1990: 436, Kassebeer 1999b: 156). Distribution map (Dirickx 1994: 45, 173).

**New site.** High Atlas: Lac Oukaïmeden, 18/VI/2014, 1♂, sweep net, leg. Bot.

**Comment.** New record for the High Atlas.

**Distribution.** Western and Central Palaearctic.

Genus *IGHBOULOMYIA* Kassebeer, 1999

*Ighboulomyia atlasi* Kassebeer, 1999

**Literature record.** Middle Atlas (Kassebeer 1999a: 11–24).

**New site.** Middle Atlas: Oued d’Ifrane, 10/VI/2014, 8♂♂, 3♀♀, sweep net, leg. Bot.

**Comments.** Monotypic genus *Ighboulomyia* with *Ighboulomyia atlasi*, described by Kassebeer (1999a). The genus *Ighboulomyia* was placed in the tribe Brachyopini. The genus is endemic to Morocco.

**Distribution.** Morocco.

Genus *MYOLEPTA* Newman, 1838

*Myolepta difformis* Strobl, 1909

**Literature records.** High Atlas (Dirickx 1994: 93, as *Myolepta philonis*, Reemer et al. 2004: 558, 567). Cited (Speight 2018: 162).

**Distribution.** Portugal, Spain, Algeria, Tunisia, and Morocco.
Genus *NEOASCIA* Williston, 1886

*Neoascia clauseni* Hauser and Kassebeer 1998

**Literature records.** Rif (Gil Collado 1929: 40, as *Neoascia podagrica*). Central Plateau (Părvu et al. 2006: 275). High Atlas (Hauser and Kassebeer 1998: 38–42). Listed (Claussen 1989b: 373, as *Neoascia podagrica*). Distribution map (Dirickx 1994: 94, 244).

**New sites.** Rif: Oued Jnane Niche, 14/VI/2013, 1 ♀; Oued Majjou (Hafa meqlouba), 10/V/2014, 1 ♀, sweep net, leg. Sahib and Belqat.

**Distribution.** Algeria, Tunisia, and Morocco.

Genus *ORTHONEVRA* Macquart, 1829

*Orthonevra bouazzai* Kassebeer, 1999

**Literature record.** Middle Atlas (Kassebeer 1999a: 158–161).

**Comment.** Endemic to Morocco.

**Distribution.** Morocco.

*Orthonevra brevicornis* (Loew, 1843) (Fig. 2)

**New record.** Rif: Ain Afersiw (Fig. 3), 11/VI/2013, 1 ♀, sweep net, leg. Sahib and Belqat.

**Comment.** New record for Morocco. In North Africa, the species was known only from Algeria (Djellab et al. 2013: 6). It prefers forests and wet woodland, standing-water bodies and flushes among Quercus forest, humid *Pinus sylvestris* forest and wet *Salix* woodland. It visits flowers such as Apiaceae, *Cornus, Crateagus, Malus, Pyrus communis, Ranunculus, Rorippa, Salix* (Speight 2018) in sunlit glades among woodland. The species is collected in the present study in a pond surrounded by Conifer reforestation, with the edges overgrown by grasses and herbaceous vegetation including fern, *Rubus* and *Cistus monspeliensis*.

**Distribution.** Western and Central Palaearctic.

*Orthonevra elegans* (Meigen, 1822)

**Literature records.** Rif (Becker and Stein 1913: 87). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 96, 246).

**Distribution.** Palaearctic.

*Orthonevra schacti* Claussen, 1989

**Literature records.** High Atlas (Claussen 1989b, Dirickx 1994: 97, Kassebeer 1999a: 160).

**Comments.** Endemic to Morocco.

**Distribution.** Morocco.
Genus **RIPONNENSIA** Maibach, Goeldin and Speight 1994

*Riponnensia longicornis* (Loew, 1843)

**Literature records.** Central Plateau (Séguy 1961: 23, as *Orthonevra longicornis*). High Atlas (Kanervo 1939: 2, as *Orthonevra longicornis*, Kassebeer 1999a: 162). Middle Atlas (Kassebeer 1999a: 162). Cited (Speight 2018: 224). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 97, 247).

**Distribution.** Mediterranean Basin.

*Riponnensia splendens* (Meigen, 1822)

**Literature records.** Rif (Gil Collado 1929: 405, as *Chrysogaster splendens*). Middle Atlas (Kassebeer 1999a: 162). High Atlas (Claussen 1989b, as *Orthonevra splendens*, Kassebeer 1999a: 162). Recorded and listed (Claussen 1989b: 363, 373). Distribution map (Dirickx 1994: 97, 248 (as *Orthonevra splendens*)).

**New site.** Middle Atlas: Douar Zaouiat Cheikh, 19/III/2008, 2♂♂, sweep net, leg. A. van Eck.

**Distribution.** Western Palaearctic.

Tribe **ERISTALINI** Newman, 1834

Genus **ANASIMYIA** Schiner, 1864

*Anasimyia contracta* Claussen and Torp, 1980

**Literature record.** Middle Atlas (Kassebeer 1999a: 22).

**Distribution.** Western Palaearctic.
Genus *ERISTALINUS* Rondani, 1845

*Eristalinus aeneus* (Scopoli, 1763)

**Literature records.** Rif (Becker and Stein 1913: 86, as *Lumpetia aenea*, Gil Collado 1929: 406, 407 (as *Eristalis aeneus*), Leclercq 1961: 242, as *Eristalis aeneus*). Central Plateau (Timon-David 1951: 146, as *Lathyrophthalmus aeneus*, Gil Collado 1929, Séguy 1930: 129, as *Lathyrophthalmus aeneus*). High Atlas (Kanervo 1939: 5, as *Lathyrophthalmus aeneus*, Gill Collado 1929). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 53, 54, 190).

**New sites.** Rif: Jumb Kitane, 05/IV/2015, 1♂, sweep net, leg. Sahib and Belqat.

**High Atlas:** Vicinity of Asni, 05/VI/2014, 1♀, sweep net, leg. Bot.

**Distribution.** Holarctic, Afrotropical, Oriental, and Australasian regions.

*Eristalinus megacephalus* (Rossi, 1794)

**Literature records.** Rif (Becker and Stein 1913: 85, as *Eristalis quinquelineatus*, Gil Collado 1929: 407, as *Eristalis quinquelineatus*). Central Plateau (Séguy 1930: 129, as *Lathyrophthalmus quinquelineatus*). Cited (Séguy 1961: 200). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 54, 190).
**Distribution.** Western Palaearctic and Afrotropical regions.

**Eristalinus sepulchralis** (Linnaeus, 1758)

**Literature records.** Rif (Becker and Stein 1913: 85, as *Eristalis sepulchralis*, Gil Collado 1929: 406, as *Eristalis sepulchralis*). Central Plateau (Gil Collado 1929). High Atlas (Claussen 1989b: 366, 372). Distribution map (Dirickx 1994: 54, 191).

**Distribution.** Palaearctic and India.

**Eristalinus taeniops** (Wiedemann, 1818)

**Literature records.** Rif (Becker and Stein 1913: 85, as *Eristalis taeniops*). Central Plateau, High Atlas (Séguy 1930: 130). Middle Atlas (Leclercq 1961: 243). Listed (Claussen 1989b: 372). Cited (Speight 2018: 79). Distribution map (Dirickx 1994: 55, 191).

**New sites.** Rif: Oued Martil, 13/XII/2013, 1 ♀; Halouma Kitane, 1/I/2015, 1 ♂, sweep net, leg. Sahib and Belqat; Oued Sidi Yahya Aârab, 3/II/2015, 2 ♂♂, 1 ♀. Middle Atlas: Bridge Oued Oum Er-rabie (Douar Ahl Souss), 17/V/2017, 1 ♂, reared by Sahib and Belqat.

**Distribution.** Palaearctic, Oriental, and Afrotropical regions.

**Genus Eristalis** Latreille, 1804

**Eristalis arbustorum** (Linnaeus, 1758)

**Literature records.** Rif (Becker and Stein 1913: 85, Gil Collado 1929: 407, Kanervo 1939: 4). Central Plateau (Timon-David 1951: 146). Middle Atlas (Claussen 1989b: 366, Timon-David 1951: 146, Séguy 1930: 129). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 55, 192).

**New sites.** Rif: Aïn Sidi Brahim Ben Arrif, 25/IV/2014, 1 ♂, sweep net, leg. Sahib and Belqat. Middle Atlas: Vicinity of Ifrane, 7/VI/2014, 1 ♀, sweep net, leg. Bot. High Atlas: Vicinity of Asni, 05/VI/2014, 2 ♂♂, 07/VI/2014, 1 ♀; Lac Oukaïmeden, 18/VI/2014, 3 ♂♂, 19/VI/2014, 1 ♂, 1 ♀, sweep net, leg. Bot. Anti Atlas: Douar Issafen, 12/IV/2015, 1 ♂; Douar Issafen, 14/IV/2015, 2 ♀, sweep net, leg. Schmid-Egger.

**Comment.** New records for the High Atlas and the Anti Atlas.

**Distribution.** Holarctic and Oriental regions.

**Eristalis pertinax** (Scopoli, 1763)

**Literature records.** Central Plateau, Middle Atlas, High Atlas (Séguy 1930: 130). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 56, 194).

**Distribution.** Western Palaearctic.
**Eristalis similis** (Fallén, 1817)

**Literature records.** Rif (Gil Collado 1929: 407, as *Eristalis pratorum*). High Atlas (Claussen 1989b: 366, 372). Cited (Séguy 1961: as *Eristalis pratorum*). Distribution map (Dirickx 1994: 56, 195).

**New sites.** Rif: Forest house, 18/V/2014, 1♂, 2♀♀, sweep net, leg. Sahib and Belqat. High Atlas: Douar Zaouiat Cheikh, 19/III/2008, 1♂, sweep net, leg. AvEck; Lac Oukaïmeden, 19/VI/2014, 1♀, sweep net, leg. Bot.

**Distribution.** Palaearctic.

**Eristalis tenax** (Linnaeus, 1758)

**Literature records.** Rif (Becker and Stein 1913: 85, as *Erystalomyia tenax*, Gil Collado 1929: 407, Kanervo 1939: 5, Leclercq 1961: 242). Central Plateau (Gil Collado 1929: 407, Timon-David 1951, as *Erystalomyia tenax*). Middle Atlas (Kanervo 1939, Timon-David 1951: 146, Leclercq 1961). High Atlas (Gil Collado 1929, Kanervo 1939, Timon-David 1951). Anti Atlas (Séguy 1949: 156, Timon-David 1951: 146). Cited (Séguy 1930: 130). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 57, 195).

**New sites.** Rif: Village Sebt Zinnat, 15/III/2008, 1♀; Belyounech, 9/V/2013, 1♂; Aïn Takhninjoute, 17/V/2014, 2♂♂; Forest house, 18/V/2014, 1♀; Jumb Kitane, 18/IV/2018, 1♀; Meadow Fahs Lmhar, 15/IV/2018, 2♂♂, sweep net, leg. Sahib and Belqat. High Atlas: Douar Zaouiat Cheikh, 19/III/2008, 1♂, sweep net, leg. AvEck; Vicinity of Asni, 05/VI/2014, 1♀, sweep net, leg. Bot; Lac Oukaïmeden, 18/VI/2014, 2♂♂, sweep net, leg. Bot.

**Distribution.** Cosmopolitan, except Antarctica.

**Genus HELOPHILUS** Meigen, 1822

**Helophilus trivittatus** (Fabricius, 1805)

**Literature records.** Rif (Becker and Stein 1913: 86, Gil Collado 1929: 407). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 70, 209).

**Distribution.** Palaearctic.

**Genus MALLOTA** Meigen, 1822

**Mallota cimbiciformis** (Fallen, 1817)

**Literature records.** Rif (Becker and Stein 1913: 85, as *Mallota eristaloides*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 73, 213).

**Distribution.** Western and Central Palaearctic.
**Mallota dusmeti** Andreu, 1926

**Literature records.** High Atlas (Kassebeer 1998a: 23).
**Distribution.** Portugal, central Spain, Tunisia, and Morocco.

**Genus MELANOGASTER** Róndani, 1857

**Melanogaster lindbergi** Kassebeer, 1999

**Literature records.** Rif (Becker and Stein 1913: 87, as *Chrysogaster macquarti*). Middle Atlas (Kanervo 1939: 2, as *Chrysogaster viduata*, Kassebeer 1999a: 158). Cited (Séguy 1961: 27, 28 (as *Chrysogaster viduata*)). Listed (Claussen 1989b: 372, as *Chrysogaster lucida*). Distribution map (Dirickx 1994: 46, 175 (as *Chrysogaster viduata*)).
**Comment.** Endemic to Morocco.

**Distribution.** Morocco.

**Genus MYATHROPA** Rondani, 1845

**Myathropa florea** (Linnaeus, 1758)

**Literature records.** Rif (Becker and Stein 1913: 85, Gil Collado 1929: 407). Middle Atlas (Séguy 1930, Claussen 1989b: 366). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 92, 240).

**New site.** Rif: Oued 15 km from Fifi, 6/V/2014, 1♀, sweep net, leg. Sahib and Belqat.

**Distribution.** Palaearctic.

**Genus PARHELOPHILUS** Girschner, 1897

**Parhelophilus versicolor** (Fabricius, 1794)

**Literature records.** Central Plateau (Gil Collado 1929: 407, as *Helophilus versicolor*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 104, 258).

**Distribution.** Palaearctic.

**Tribe EUMERINI** Smirnov, 1924

**Genus EUMERUS** Meigen, 1822

**Eumerus amoenus** loew, 1848

**Literature records.** Cited (Séguy 1961: 207, Speight 2018: 87). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 57, 196).

**New sites.** High Atlas: Douar Aourir, 8/IV/2015, 2♂♂. Anti Atlas: Beach of Tamelalt, 9/IV/2015, 1♂, sweep net, leg. Schmid-Egger.

**Comment.** New records for the Anti Atlas.

**Distribution.** Palaearctic.
**Eumerus barbarus** (Coquebert, 1804)

**Literature records.** Rif (Gil Collado 1929: 412, as *Eumerus australis*, Becker and Stein 1913: 86). Middle Atlas (Claussen 1989b: 363). High Atlas (Gil Collado 1929: 412). Cited (Séguy 1961: 208, Speight 2018: 88). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 58, 196).

**Distribution.** Mediterranean Basin.

**Eumerus basalis** Loew, 1848

**Literature records.** Middle Atlas (Séguy 1930: 130, as *Eumerus angusticornis*). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 58, 197).

**Distribution.** Western Palaearctic.

**Eumerus caballeroi** Gil-Collado, 1929

**Literature records.** Central Plateau (Gil Collado 1929: 412–414). Listed (Claussen 1989b: 372). Cited (Speight 2018: 89). Distribution map (Dirickx 1994: 59, 197).

**Distribution.** Spain and Morocco.

**Eumerus hungaricus** Szilády, 1940

**Literature record.** Cited (Speight 2018: 92).

**Distribution.** Mediterranean Basin.

**Eumerus lunatus** (Fabricus, 1794)

**Literature records.** Rif (Becker and Stein 1913: 86, as *Eumerus lunatatus*, Leclercq 1961: 243). Listed (Claussen 1989b: 372). Cited (Speight 2018: 94). Distribution map (Dirickx 1994: 62, 200).

**Distribution.** Afrotropical Region, Morocco. The Europe records require confirmation.

**Eumerus melotus** (Séguy, 1941)

**Literature records.** High Atlas (Séguy 1941: 13, as *Lampetia melota*). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 62).

**Comments.** Endemic to Morocco.

**Distribution.** Morocco.

**Eumerus nudus** Loew, 1848

**Literature records.** Rif (Becker and Stein 1913: 86). Cited (Speight 2018: 95). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 64, 201).

**Distribution.** Mediterranean Basin, Romania, and former Yugoslavia.
**Eumerus obliquus** (Fabricius, 1805) (Fig. 4)

**New records.** Rif: Oued Jnane Niche (Fig. 5), 25/IV/2015, 1♂, sweep net, leg. Sahib and Belqat. Eastern region: Oued El Khemis (Fig. 6), 11/IX/2013, 1♂, sweep net, leg. Sahib and Belqat.

**Comments.** New to Morocco. *E. obliquus* was recorded from Egypt (Steyskal and El-Bialy 1967, Peck 1988). The species is found in open ground, thinly vegetated, semi-arid dry grassland, often along the margins of seasonal rivers; it feeds from the juice of ripe, fallen fruits of *Opuntia* (Speight 2018). In Morocco, we collected adults by sweeping the vegetation around lotic habitats. As stated in the literature, we found the species in the margins of a temporary river. The wet section was reduced to a thin layer of water. Riparian vegetation consisted primarily of *Opuntia ficus indica* (Fig. 5), of *Nerium oleander*, and herbaceous vegetation. The second habitat was also a river flowing towards oued Moulouya with predominant vegetation consisted of *Olea europea*, *Citrus sinensis*, *Citrus reticulata*, *Punica granatum*, and *Eucalyptus*.

**Distribution.** Mediterranean Basin, the Canaries, Afrotropical, Malagasy, Australasian regions.

**Eumerus ornatus** Meigen, 1822

**Literature records.** Middle Atlas (Séguy 1930: 130). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 64, 202).

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*Figure 4. Eumerus obliquus*, male, lateral view.
Distribution. Western Palaearctic.

*Eumerus pulchellus* Loew, 1848

**Literature records.** Cited (Séguy 1961: 211). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 65, 203).

**Distribution.** Western Palaearctic.

*Eumerus punctifrons* Loew, 1857

**Literature records.** Rif (Leclercq 1961: 243). Listed (Claussen 1989: 372). Distribution map (Dirickx 1994: 65, 203).

**Distribution.** Afrotropical Region, southern part of the Mediterranean Basin.

*Eumerus pusillus* Loew, 1848

**Literature records.** High Atlas (Claussen 1989b: 363, 372). Distribution map (Dirickx 1994: 66, 203).

**Distribution.** Mediterranean Basin.

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*Figure 5.* Habitat of *Eumerus obliquus*: Oued Jnane Niche environment.
**Eumerus sabulonum** (Fallén, 1817)

**Literature records.** Cited (Séguy 1961: 212). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 66, 204).

**Distribution.** Western Palaearctic.

**Eumerus schmideggeri** Van Steenis, Hauser and Van Zuijen, 2017

**Literature record.** Anti Atlas (Van Steenis et al. 2017: 155–158).

**Distribution.** Algeria, Tunisia, and Morocco.

**Eumerus strigatus** (Fallén, 1817)

**Literature records.** Rif, High Atlas (Kanervo 1939: 5). Central Plateau (Timon-David 1951: 147). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 67, 205).

**Distribution.** Palaearctic, North America, Australia, and New Zealand.

*Figure 6. Habitat of *Eumerus obliquus*: Oued El Khemis environment.*
**Eumerus subornatus** Claussen, 1989

**Literature records.** High Atlas (Claussen 1989b: 364, 365, 372). Cited (Speight 2018: 100). Distribution map (Dirickx 1994: 68).

**Distribution.** Portugal, France, Spain, and Morocco.

**Eumerus truncatus** Rondani, 1868

**Literature records.** Anti Atlas (Van Steenis et al. 2017: 160). Cited (Speight 2018: 102).

**Distribution.** Portugal, Spain, Greece, Italy, Tunisia, and Morocco.

**Genus** *PLATYNOCHAETUS* Wiedemann, 1830

**Platynochaetus rufus** Macquart, 1835

**Literature records.** Central Plateau (Gil Collado 1929: 407). Distribution map (Dirickx 1994: 113, 271).

**Distribution.** Maltese islands, Algeria, and Morocco.

**Platynochaetus setosus** (Fabricius, 1794)

**Literature records.** High Atlas (Gil Collado 1929: 407). Listed (Claussen 1989b: 373). Cited (Speight 2018: 217). Distribution map (Dirickx 1994: 114, 272).

**Distribution.** Western part of the Mediterranean Basin.

**Tribe** MERODONTINI (Edwards, 1915)

**Genus** *MERODON* Meigen, 1803

**Merodon aberrans** Egger, 1860

**Literature records.** Cited (Séguy 1961: 174, as Lampetia aberrans, Speight 2018: 132). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 77, 220).

**Distribution.** Western Palaearctic.

**Merodon arrasus** Beck, 1921

**Literature records.** Rif (Becker 1921: 54, 55). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 78, 222).

**Distribution.** Tunisia, Algeria, and Morocco.
**Merodon bequaerti** Hurkmans, 1993

**Literature records.** Middle Atlas; Eastern region (Vujić et al. 2020: 98).

**Comments.** *Merodon bequaerti* belongs to the *Merodon serrulatus* species group (Vujić et al. 2020: 81); this species could be *Merodon alexeji* (Hurkmans 1993: 163).

**Distribution.** Algeria, Tunisia, Libya, and Morocco.

**Merodon biarcuatus** Curran, 1939

**Literature records.** Central Plateau (Curran 1939: 6, 7). Listed (Claussen 1989b: 373). Cited (Speight 2018: 137). Distribution map (Dirickx 1994: 79).

**Distribution.** France, Italy, Greece, Turkey, and Morocco.

**Merodon cabanerensis** Marcos-García, Vujić and Mengual, 2007

**Literature records.** High Atlas (Vujić et al. 2018: 113, 114, 135). Cited (Speight 2018: 137).

**Distribution.** Spain and Morocco.

**Merodon chalybeus** Wiedemann in Meigen, 1822

**Literature records.** Central plateau (Timon-David 1951: 146, as *Lampetia spicata*). Cited (Claussen 1989b: 365, 373 (as *Merodon spicatus*), Marcos-García et al. 2007: 546, Speight 2018: 138). Cited (Speight 2018: 138). Distribution map (Dirickx 1994: 87, 233).

**Distribution.** Mediterranean Basin.

**Merodon clavipes** (Fabricius, 1781)

**Literature records.** Cited (Hurkmans 1993: 178, 230, Marcos-García et al. 2007: 548, Speight 2018: 138).

**Distribution.** Western Palaearctic.

**Merodon constans** (Rossi, 1794)

**Literature records.** Rif (Becker and Stein 1913: 86, as *Lampetia constans*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 81, 226).

**Distribution.** Western Palaearctic.

**Merodon distinctus** Palma, 1863

**Literature records.** Middle Atlas, Central Plateau (Timon-David 1951: 146, as *Lampetia distincta*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 81, 226).

**Distribution.** Mediterranean Basin.
**Merodon elegans** Hurkmans, 1993

**Literature records.** Central Plateau (Hurkmans 1993: 195). Cited (Speight 2018: 141).
**Distribution.** Western part of Mediterranean Basin.

**Merodon eques** Fabricius, 1805

**Literature records.** Cited (Séguy 1961: 178, as *lampetia eques*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 81, 227).
**Distribution.** Mediterranean Basin.

**Merodon equestris** (Fabricius, 1794)

**Literature records.** Central Plateau (Fabricius 1805: 240, as *Eristalis ferrugineus*). Cited (Séguy 1961: 178, 179 (as *Lampetia equestris*). Listed (Claussen 1989: 373). Distribution map (Dirickx 1994: 81, 227).
**Distribution.** Holarctic.

**Merodon escalerae** Gil Collado, 1929

**Literature records.** Central Plateau (Gil Collado 1929: 408, 409). Listed (Claussen 1989b: 373). (Dirickx 1994: 82).
**Distribution.** Spain and Morocco.

**Merodon geniculatus** Strobl, 1909

**Literature records.** Rif (Gil Collado 1929: 408). Listed (Claussen 1989b: 365, 373). Cited (Speight 2018: 144). Distribution map (Dirickx 1994: 83, 229).
**New Site.** High Atlas: Lac Oukaïmeden, 18/VI/2014, 2♂♂, 1♀, 19/VI/2014, 6♂♂, sweep net, leg. Bot.
**Comment.** New record for the High Atlas.
**Distribution.** Mediterranean Basin.

**Merodon ibericus** Vujic, 2015

**Literature records.** Rif (Becker and Stein 1913: 86, as *Lampetia spinipes*, Gil Collado 1929: 409, as *Merodon spinipes* var. *avidus*, Kanervo 1939: 5). Central Plateau (Séguy 1930: 130, Timon-David 1951: 146, as *Lampetia spinipes*). Middle Atlas (Séguy 1930: 130, Kanervo 1939: 5, as *Lampetia spinipes* var. *avidus*, Popović et al. 2015: 796, Acan-

**New Site.** High Atlas: Lac Oukaïmeden, 18/VI/2014, 1♂, 1♀, 19/VI/2014, 1♂, sweep net, leg. Bot.
Distribution. Portugal, Spain, and Morocco.

**Merodon italicus** Rondani, 1845

**Literature records.** Middle Atlas (Claussen and Hauser 1990: 437, as *Merodon longicornis*). Distribution map (Dirickx 1994: 84, 230).

**Distribution.** Mediterranean Europe, southern Russia, Lebanon, and Morocco.

**Merodon maroccanus** Gil Collado, 1929

**Literature records.** Central Plateau (Gil Collado 1929: 410, 411). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 84).

**Comments.** Endemic to Morocco.

**Distribution.** Morocco.

**Merodon minutus** Strobl, 1893

**Literature records.** Middle Atlas (Séguy 1961: 180, as *lampetia minutus*). Listed (Claussen 1989b: 373). Cited (Speight 2018: 149). Distribution map (Dirickx 1994: 84, 230).

**Distribution.** Southern France around the Mediterranean coast to the Balkan Peninsula.

**Merodon murorum** (Fabricius, 1794)

**Literature records.** Central Plateau (Fabricius 1794: 288, as *Syrphus murorum*, Meigen 1830: 354, as *Merodon auripilus*). High Atlas (Séguy 1941: 13, as *Lampetia auripila*). Cited (Séguy 1961: 176). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 79, 222).

**Comments.** Revised by Vujić et al. (2018: 123–125). *Merodon auripilus* is a junior synonym of *M. murorum*.

**Distribution.** Algeria, Tunisia, and Morocco.

**Merodon pruni** (Rossi, 1790)

**Literature records.** Rif (Becker and Stein 1913: 86, as *Lampetia pruni*, Gil Collado 1929: 407, 408 (as *Merodon pruni* var. *obscurus*). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 85, 231).

**Distribution.** Western Palaearctic, including Turkmenistan and Iraq.

**Merodon pumilus** Macquart, 1849

**Literature records.** Rif (Becker and Stein 1913: 86, as *Lampetia aenea*, Kanervo 1939: 5, as *Lampetia aenea*, Ebejer et al. 2019: 150). Central Plateau (Gil Collado 1929:
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Merodon rufus Meigen, 1838

**Literature records.** Rif (Becker and Stein 1913: 86, as Lampetia rufa). Listed (Claussen 1989b: 373). Distribution (Dirickx 1994: 86, 232).

**Distribution.** Western and Central Palaearctic.

Merodon segetum (Fabricius, 1794)

**Literature records.** Cited (Peck 1988: 173). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 86, 232).

**Distribution.** Spain, Gibraltar, Macedonia, Crete, Algeria, and Morocco.

Merodon sophron Hurkmans, 1993

**Literature records.** Middle Atlas (Hurkmans 1993: 168, Vujic et al. 2020: 135–137).

**Comment.** Endemic to Morocco. Merodon sophron is one of the 13 species belonging to the Merodon serrulatus species group. It is redefined and redescribed by Vujic et al. (2020) on the material from the type locality of Azrou.

**Distribution.** Morocco.

Merodon tangerensis Hurkmans, 1993

**Literature record.** Rif (Hurkmans 1993: 172).

**Comment.** Endemic to Morocco.

**Distribution.** Morocco.

Merodon tricinctus Sack, 1913

**Literature records.** High Atlas, Anti Atlas (Kassebeer 1998a: 24). Middle Atlas (Timon-David 1951: 146, as Lampetia tricincta). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 88, 234).

**Distribution.** Western Palaearctic.

Merodon unguicornis Strobl 1909 (Fig. 7)

**Literature record.** Middle Atlas (Ebejer et al. 2019: 150).

**New site.** Rif: Forest house, 17/V/2014, 1 ♀, sweep net, leg. Sahib and Belqat.

**Comment.** New record for the Rif. M. unguicornis was cited for the first time in Morocco by Ebejer et al. (2019). In the present work, the female was collected at the locality of Forest house environment (Fig. 8), crossed by a spring and a brook and where the most
predominant vegetation was formed by *Abies marocana, Pinus negra, Pinus pinaster, Cedrus atlantica and Berberis hispanica*. Collected on a misty day, as visualized in Figure 8.

**Distribution.** Spain and Morocco.

**Genus PSILOTA Meigen, 1822**

*Psilota atra* (Fallén, 1817)

**Literature records.** High Atlas (Kassebeer 1995b: 395–400, as *Psilota toubkalana*). Cited (Smit and Vujić 2008: 350, Speight 2018: 220).

**New Site.** Middle Atlas: Douar Zaouiat Cheikh, 19/III/2008, 1 ♀, sweep net, leg. A. van Eck.

**Comment.** New record for the Middle Atlas.

**Distribution.** Europe and Morocco.

**Tribe VOLUCELLINI Newman, 1834**

**Genus VOLUCELLA Geoffroy, 1762**

*Volucella inanis* (Linnaeus, 1758)

**Literature records.** Middle Atlas (Claussen and Hauser 1990: 436). Distribution map (Dirickx 1994: 126, 289).
Distribution. Palaearctic.

*Volucella liquida* Erichson in Wagner, 1841

**Literature records.** Rif (Gil Collado 1929: 406, Leclercq 1961: 242). Central Plateau (Timon-David 1951: 146, Séguy 1930: 129). Middle Atlas (Kanervo 1939: 4, Timon-David 1951: 146, Séguy 1953: 84, Leclercq 1961). High Atlas (Séguy 1930: 129). Listed (Claussen 1989b: 374). Distribution (Dirickx 1994: 127, 289).

**New site.** Rif: Jumb Kitane, 19/IX/2017, 1♀, sweep net, leg. Sahib and Belqat.

**Distribution.** Algeria and Morocco.

*Volucella zonaria* (Poda, 1761)

**Literature records.** Central Plateau (Séguy 1930: 129). Listed (Claussen 1989b: 374). Distribution map (Dirickx 1994: 127, 290).

**Distribution.** Palaearctic.
Tribe XYLOTINI Bigot, 1883
Genus BRACHYPALPUS Macquart, 1834

Brachypalus valgus (Panzer, 1798)

Literature records. High Atlas, Middle Atlas (Kassebeer 1998a: 22).
Distribution. Western Palaearctic.

Genus MILESIA Latreille, 1804

Milesia crabroniformis (Fabricius, 1775)

Literature records. Middle Atlas (Claussen and Hauser 1990: 437). Distribution map (Dirickx 1994: 92, 240).
Distribution. Europe, Turkey, Georgia, and Morocco.

Genus SPILOMYIA Meigen, 1803

Spilomyia maroccana Kuznetsov, 1997

Literature records. Rif (Becker and Stein 1913: 86, as Spilomyia digitate, Kuznetsov 1997: 203–205). High Atlas (Claussen 1989b: 366). Listed (Claussen 1989b: 373, as Spilomyia digitata). Distribution map (Dirickx 1994: 123, 283 (as Spilomyia digitata)).
Distribution. Algeria and Morocco.

Genus SYRITTA Lepeletier and Serville, 1828

Syritta flaviventris Macquart, 1842

Literature records. Central Plateau (Claussen 1989b: 366). Listed (Claussen 1989b: 373). Distribution map (Dirickx 1994: 123, 284).
New site. Eastern region: Farm Saf-Saf, 14/VI/2013, 1♂, 1♀, sweep net, leg. Sahib and Belqat.
Comment. New record for the Eastern region.
Distribution. Mediterranean Basin, Nearctic, Neotropical, Afrotropical regions, Madagascar and the Mascarene islands.

Syritta pipiens (Linnaeus, 1758)

Literature records. Rif (Becker and Stein 1913: 88, Gill Collado 1929: 412, Kanervo 1939: 5). Central Plateau (Séguy 1930: 130, Timon-David 1951, Pârvu et al. 2006: 275). Middle Atlas (Séguy 1930). High Atlas (Timon-David 1951: 146, Claussen 1989b: 366). Listed (Claussen 1989b: 373). Distribution map (Dirickx 994: 124, 285).
New sites. Rif: Bni Maaden, 5/XI/2013, 1♂; Dam Moulay Bouhcha, 5/IV/2014, 1♀; Oued El Koub, 30/V/2014, 1♂, 1♀; Douar Kitane, 18/VI/2014, 2♀♂; Oued Majjou (Hafa meqlouba), 27/IV/2015, 1♂, sweep net, leg. Sahib and Belqat. Eastern region: Farm Saf-Saf, 14/VI/2013, 4♂♀, sweep net, leg. Sahib and Belqat. Middle Atlas: Vicinity of Ifrane, 09/VI/2014, 1♀, sweep net, leg. Bot. High Atlas: Vicinity of Asni, 07/VI/2014, 5♂♂; Tizi N’T est, 15/VI/2014, 1♂, sweep net, leg. Bot. Anti Atlas: Oued Assa, 21/V/2015, 1♀, sweep net, leg. Sahib and Belqat.

Comment. New records for the Eastern region and the Anti Atlas.

Distribution. Holarctic, South America, and Indomalayan Region.

Genus TEMNOSTOMA Lepeletier and Serville, 1828

Temnostoma bombylans (Fabricius, 1805)

Literature records. Middle Atlas (Séguy 1961: 155). Listed (Claussen 1989b: 374). Distribution map (Dirickx 1994: 125, 286).

Distribution. Palaearctic.

Genus XYLOTA Meigen, 1822

Xylota segnis (Linnaeus, 1758)

Literature records. Rif (Becker and Stein 1913: 86, as Zelima (Xylota) segnis, Gil Collado 1929: 412, Leclercq 1961: 243). High Atlas (Timon-David 1951: 147). Listed (Claussen 1989b: 372). Distribution map (Dirickx 1994: 130, 293).

New site. Rif: Ain El Maounzil, 17/V/2014, 1♀; Oued El Koub, 30/V/2014, 1♀; Oued Sidi Ben Sâada, 6/V/2015, 1♂, sweep net, leg. Sahib and Belqat. High Atlas: Vicinity of Asni, 07/VI/2014, 1♂, sweep net, leg. Bot.

Distribution. Palaearctic and eastern North America.

Subfamily PIPIZINAE Mengual, Santos and Rojo 2015
Tribe PIPIZINI Williston, 1885
Genus HERINGIA Rondani, 1856

Heringia beringi (Zetterstedt, 1843)

Literature records. High Atlas, Middle Atlas (Kassebeer 1998a: 23).

Distribution. Palaearctic.

Genus PIPIZELLA Rondani, 1856

Pipizella thapsiana Kassebeer, 1995

Literature records. High Atlas (Kassebeer 1995a: 261–263). Cited (Speight 2018: 199).
New site. Middle Atlas: Douar Zaouiat Cheikh, 19/III/2008, 1♂, sweep net, leg. A. van Eck.

Comment. New record for the Middle Atlas.
Distribution. Portugal and Morocco.

Genus *TRIGLYPHUS* Loew

*Triglyphus escalerai* Gil Collado, 1929

Literature records. Rif (Gil Collado 1929: 404). Cited (Speight 2018: 253). Distribution map (Dirickx 1994: 125).

Distribution. Portugal, Croatia, Montenegro, and Morocco.

Discussion

The present work provides an important contribution to the Moroccan hoverfly fauna with two species recorded for the first time for Morocco: *Eumerus obliquus* (Fabricius, 1805) and *Orthonevra brevicornis* (Loew, 1843); nine new records are provided for the Rif, five for the Middle Atlas, and seven species are recorded for the first time for the Hight Atlas, the Anti Atlas, and the Eastern Region for which we have enlarged the distribution area. The 150 Moroccan species belong to three subfamilies, 14 tribes, and 49 genera (30 genera of Eristalinae, 16 of Syrphinae, and 3 of Pipizinae).

Knowledge of the hoverfly diversity of Morocco is unequal among regions. For instance, the Middle Atlas and the High Atlas have the same number of species (69), the Rif has 68 species, the Anti Atlas has 18 species, while the Eastern region has only seven species.

Four very common Palaearctic species were collected abundantly: *Episyrphus balteatus* (156 specimens), *Sphaerophoria scripta* (146 specimens), *Eupeodes corollae* (86 specimens) and *Melanostoma mellinum* (78 specimens).

Morocco is home to 12 endemic species: two are endemic to the Rif, four to the Middle Atlas (including both an endemic genus and species (*Ighbouloumia atlasi*)), three to the High Atlas, one to the central plateau, and two species, *Platycheirus atlasi* and *Melanogaster lindbergi*, to the Middle Atlas plus the High Atlas, and to the Rif plus the Middle Atlas, respectively.

Morocco with the greatest number of total species (150), has 75% of the North African syrphid fauna. Algeria, with 91 species, has 46% of the total fauna. Tunisia, with 69, has 35% of the fauna, whereas Egypt and Libya have 51 species (26%) and 34 species (17%), respectively.

Algeria, Tunisia, Libya, and Egypt share with Morocco 71, 55, 25, and 30 species, respectively, but these numbers are likely to change and a detailed comparison must await a systematic sampling of the whole region.

Of the two Iberian Peninsula countries, Spain has the best known Syrphiidae fauna with 417 species whereas Portugal has only 195 species (Marcos-Garcia et al. 2002, Speight 2015, van Eck 2011, 2016).
These new data on the Moroccan hoverfly fauna reflect the variety of suitable habitats and suggest that many more species can yet be found in Morocco, that provides a wide variety of geographical and climatic properties. New species are also likely to be discovered by genomic prospecting using molecular approaches.

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