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## COMMUNICATION

### THE ODONATA (INSECTA) OF NORTHERN AND CENTRAL OMAN

Elaine M. Cowan & Peter J. Cowan

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## THE ODONATA (INSECTA) OF NORTHERN AND CENTRAL OMAN

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**Abstract:** Oman is largely a desert country with a mainly arid climate. We summarise published records of Odonata (Insecta) for northern and central Oman, present our photographic records of the same there for 50 sites and give an apparent-status statement for most species (the more afro-tropical Dhofar governorate is excluded). Highlights are photographed *Orthetrum ransonnetii*, *Macrodiplox cora* (ovipositing in tandem) and *Urothemis thomasi*. Of the 44 species for Oman, 36 have been recorded in northern and central Oman (eight zygopteran and 28 anisopteran species). All are Least Concern except *Arabineura khalidi* and *Urothemis thomasi*, both Endangered, and *Paragomphus sinaiticus*, Near Threatened.

**Keywords:** Arabian peninsula, dragonflies, *Macrodiplox cora*, *Paragomphus sinaiticus*, species inventory, *Urothemis thomasi*.

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**Author Details:** ELAINE M. COWAN is an honorary senior lecturer and is interested in odonates. PETER J. COWAN is an arid regions wildlife specialist and associate professor.

**Author contribution:** EMC was primarily responsible for photography, record keeping and identification. PJC was primarily responsible for preparation of the manuscript. Both authors were active locating odonates in the field.

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## INTRODUCTION

This paper presents the status of Odonata (dragonflies and damselflies) species in northern and central Oman. Oman is largely a desert country with a mainly arid climate (Fisher et al. 1999; El-Baz 2002; Luedeling & Buerkert 2008) but southernmost Oman, Dhofar governorate, requires separate consideration due to the afrotropical aspects of its biota especially of the monsoon fog/drizzle influenced escarpment north of Salalah City (Miller & Morris 1988). We summarise published records for northern and central Oman geographically, present our unpublished photographic records there for 50 sites and give an apparent-status statement for most species. The southern boundary in Oman for the present paper is the boundary between the Omani Wusta and Dhofar governorates (Fig. 1).

Waterston & Pittaway (1991) listed 36 odonate species for Oman, based on specimens collected during the Oman Flora and Fauna Survey 1975/1977 and earlier material. Schneider & Dumont (1997) presented their new records, listed all odonate specimens in the holdings of the Oman Natural History Museum (Muscat), and gave an annotated checklist of the 40 species of odonates then known for Oman. Four more species have been identified from Oman since then: *Ischnura fountaineae*, *I. nursei* and *Orthetrum abboti* in the north (Reimer et al. 2009; Franković 2012; Kunz 2015) and *Tholymis tillarga* in the far south in Dhofar governorate (Ball 2014). Weide & Kalkman (2008) included records (sight, specimens, photos) for northern and central Oman, 14–20 September and 3–4 October 2002. Cowan & Cowan (2015) presented records based on photos from 68 visits to ‘Hoota pool’, near Nizwa, in northern Oman, March 2012–June 2014 (see Cowan & Cowan 2013 for an initial presentation of the pool’s habitat and odonates). As well as reporting on a short trip to southern Oman, Schneider & Ikemeyer (2016) included records (apparently sight, photographic and specimen) from a field trip to northern Oman 31 March–5 April 2012 and presented a tabular list of Oman’s 44 odonate species.

We organise records of odonates in northern and central Oman by their occurrence in eight geographic regions (Regions 1–8, Fig. 1). Region 1, Musandam & Madha, both Omani exclaves, is separated from the remainder of Oman by parts of the United Arab Emirates. Musandam is mountainous and adjoins the Hormuz strait (Feulner 2011), Madha is further south and landlocked. Region 2, Greater Muscat, is the capital city, Muscat, and surrounding areas and extends to Yiti

in the east and south to Fanjah. Region 3, Batinah, is the plain west of Region 2 extending from the Hajar mountains northeast to the Oman sea (‘gulf of Oman’). The Hajar mountains (Regions 4–6) are divided into the Western Hajar (Region 4, extending from the UAE border in the north to Ibri in the south); the Jebel Akhdar range (Region 5, Jebel Khawr in the west, Jebel Shams at 3009m Oman’s highest mountain, Saiq plateau and east to Nizwa, Birkat and to the north Nakhal); and the Eastern Hajar (Region 6, from the Sumail Gap east to inland of Sur). Regions 4–6 include mountains (jebels), their foothills, associated springs and traditional irrigation systems (falaj, sing.; aflaj plural). The East Coast (Region 7) extends from Sur in the north then south along the east coast, including Masirah island, and as far south as the border with Dhofar governorate. The final region is the Central Desert (Region 8, from Saudi Arabia in the west to the coastal region, Region 7, in the east).

## METHODS

The systematic list of the results presents odonate species records organised by the eight geographic regions defined above. The species’ apparent status in northern and central Oman, when reasonably clear, is also given. We have summarised previously published records mainly by listing the number of sites at which a species was recorded. The specimen collection sites in northern and central Oman named in Waterston & Pittaway (1991) and Schneider & Dumont (1997) are grouped according to our geographic regions in Table 1. Schneider & Ikemeyer (2016) listed seven sites for northern Oman, in Regions 2 and 5. We treat four of them as parts of the same site (Wadi Al Abyad, Region 5).

Our photographic records of odonates were made at 50 sites (Table 2 gives the location, a brief description of each site and the number of visits), December 2008–June 2016. Every record is supported by a photographic voucher in E.M.C.’s personal collection. Our records confirm occurrence at the site on the reported day. Suitable waterbodies are relatively scarce in Oman and we found sites using the literature and Sargeant et al. (2008), by word of mouth and serendipity. A khor is a coastal creek, usually with a lagoon separated from the sea by a sand bar. The only region we did not visit was Musandam & Madha (Region 1). Spellings of transliterated place names vary widely in the literature and in Oman.

All our photos were taken by E.M.C. using a handheld



**Figure 1.** Map of northern and central Oman showing the geographic regions used in the present paper. Geographic regions: 1 - Musandam & Madha, 2 - Greater Muscat, 3 - Batinah, 4 - Western Hajar, 5 - Jebel Akhdar, 6 - Eastern Hajar, 7 - East Coast (including Masirah island), 8 - Central Desert.

Sony Cybershot camera. E.M.C.'s photographs allow for later deliberation and confirmation of identification. Photographs (Images 1–23) in the present paper illustrate species not shown in Cowan & Cowan (2013, 2015). Further observations at Hoota pool (Region 5, Table 2), after publication of Cowan & Cowan (2015), are included if they involve novel or unusual observations at that site. Identification was often facilitated by referring to Dijkstra & Lewington (2006), well-illustrated papers on the odonate fauna of the United Arab Emirates (Giles 1998; Feulner et al. 2007; Reimer 2008; Reimer et al. 2009), various other publications including Samways (2008), Subramanian (2009), Smallshire & Swash (2014), Dijkstra & Clausnitzer (2014), Boudot & Kalkman (2015), Tarboton & Tarboton (2015), and the World Dragonfly Association supported website Allodonata (2016) (<http://www.allodonata.com/>).

The sequence of species in the systematic list follows Schneider & Dumont (1997) with more recently reported species inserted after their congeners. The first line of each species account gives the scientific name and authority citation (usually following IUCN 2016). This line is followed, for each geographic region that has record(s), by our summary of previously published records, then our unpublished records ('CC:') followed by other observers' ('OO:') photographic records if any, either received directly, found on websites or in the photographically-illustrated odonate trip report to northern Oman February–early March 2010

(Wiprächtiger 2010). The latter report included other records but without corresponding photos to allow our assessment. 'Apparent status' is our understanding of status (when reasonably clear) at or near waterbodies in northern and central Oman (common, can be expected to be seen at a site; uncommon, might be seen at a site; rare, unlikely to be seen at a site).

## RESULTS

WP = Waterston & Pittaway (1991)

SD = Schneider & Dumont (1997)

CC 2015 = Cowan & Cowan (2015)

\* reproductive behaviour was observed (flight in tandem, mating wheel and/or oviposition)

W = Wadi (valley, river bed)

In 'OO:' Allodonata/photographer's name = photographer's photo in Allodonata (2016, select Oman and photographer's name then apply filter), JAA = John & Alma Atkins, EE = Jens & Hanne Eriksen (Eriksen & Eriksen 2016), DR = David Robb.

Table 2 lists the sites we visited and gives the odonate species we recorded at each site.

### Zygoptera damselflies

#### Coenagrionidae

##### *Agriocnemis pygmaea* (Rambur, 1842)

Greater Muscat: One 28 Feb 1992 (SD, Reimer 2009).

##### *Ischnura evansi* Morton, 1919

Greater Muscat: 1 site (WP). 6 sites (SD). 1 site (Schneider & Ikemeyer 2016). CC: SQU 25 Dec 2015; Qurum 22\* Aug 2015; W. Mayh 26\*, 27\* Dec 2014, 14 Feb 2015. Western Hajar CC: Fizh 15 Jan, 7 Jun 2016. Jebel Akhdar: 2 sites (WP). 4 sites (SD). Common Hoota pool\* (CC 2015). 2 sites (Schneider & Ikemeyer 2016). CC: W. Abyad 3 Dec 2015; Nakhal 14 Mar 2015; Hamra 18 Dec 2015; Nizwa hotel 17\* Sep 2013; Birkat hotel 26\* Feb 2014; W. Qtm 11 Apr, 25 Aug 2014, 18 Apr 2016. OO: 1 site (Wiprächtiger 2010). Eastern Hajar: 3 sites (WP). 2 sites (SD). CC: Bidbid 20 Nov 2015; W. Bani Khalid 18 Apr, 9 Jun 2014, 25 Mar 2015; W. Dayqah 26 Dec 2014, 23 Dec 2015; Siwayh 29 Mar 2016; W. Tiwi 27 Dec 2013, 10 Jun, 28 Nov 2014, 27\*, 28 Aug 2015; W. Rafsah 31 Mar 2016. East Coast CC: Sur 30 Mar 2016; Rumayli 3 Oct 2014. Central Desert CC: Natih 8 Apr 2010, 2 May 2014; Arff 2 May 2014, 20 Mar 2015; Naama pools 28 May 2016.

Apparent status: Common and widespread, away

**Table 1. Specimen collection sites of Waterston & Pittaway (1991) and Schneider & Dumont (1997) in northern and central Oman organised by geographic regions of the present paper. I. = Island, J. = Jebel (mountain, spelt 'Jabal' in Schneider & Dumont 1997), W. = Wadi (valley). Spellings of site names are as in their papers.**

Geographic regions	Waterston & Pittaway (1991)	Schneider & Dumont (1997)
	Site name	Site number and name
<b>1. Musandam &amp; Madha</b>	Khasab	13. J. Harim
<b>2. Greater Muscat</b>	Azaiba	5. al-Ansab lagoons
	Gaizan stream/Gurum	26. Muscat/al-Qurm/Madinat Qaboos/W. Aday/Sultan Qaboos University
	Mu'askar al Murtafaa	43. W. Bawsher
	Muscat	50. W. al-Khawdh
	Mattrah	52. W. Mayh
	Rusail	
<b>3. Batinah</b>	Sib (Seeb)	32. as-Seeb
	Sohar	34. Sohar
		64. W. Saiq
<b>4. Western Hajar</b>		46. W. Fizh
<b>5. Jebel Akhdar</b>	Al'Ain	11. al-Hamra
	Awabi	14. J. Nakhl, Wibal
	Behla	15. J. Shams
	Dasur	27. Nakhl, W. Thabat, Ain Thuarah
	Fanjah	35. Tanuf
	Jabrin	38. W. al-Abyadh
	Nakhl	39. W. Bani Awf
	Qid	41. Ulayah, W. Bani Kharus
	Rostaq	45. W. Fanjah
	W. Midan	48. W. al-Hijar

Geographic regions	Waterston & Pittaway (1991)	Schneider & Dumont (1997)
	W. Sahtan	53. W. Misfah
		54. W. Mu'aydin
		56. W. Sahtan
		61. Hail Yemen
		62. W. Bani Habib
		63. W. Duwaykhila
<b>6. Eastern Hajar</b>	Biyaq	9. Dhagmar
	Hajar	12. Ibra
	Somra	23. al-Mahalil
	Sumail Gap	25. al-Mintirib
	W. Sumail	33. Seeq
	W. Bidbid	40. W. Bani Khalid
	Sur, W. Rafsah	42. W. Batha
		47. W. al-Fulayj
		51. W. Majlas
		57. W. ash-Shaab
<b>7. East Coast</b>	Aqrin, Masirah I.	16. Janabah coast
	Haql, Masirah I.	28. Qumaylah
	Kalban, Masirah I.	29. Ra's al-Junayz
	Masirah I. airfield	
<b>8. Central desert</b>		7. Buwi
		17. Jiddat al Harasis
		18. al-Kamil
		37. Umm as-Samim
		58. Wahiba Sands
		59. Yalooni

from coast. No records from Musandam & Madha, Batinah.

#### ***Ischnura senegalensis* (Rambur, 1842)**

Greater Muscat: 1 site (WP). 1 site (SD). 1 site (Weide & Kalkman 2008). 1 site (Schneider & Ikemeyer 2016). CC: Yiti 27 Dec 2013, 27 Dec 2014, 14 Feb 2015, 21 May 2016. OO: 1 site (Wiprächtiger 2010). Eastern Hajar CC: Khor Qurayyat 29\* Mar (Image 1), 19 May 2016. East Coast CC: Rumayli 30 Nov 2013 (Image 2), 3 Jun 2016; Khor Durf 28, 29 Nov 2013, 15 Jan, 19 Sep 2015, 2 Jun 2016.

Apparent status: Mainly coastal, common. No

records from Musandam & Madha, Batinah, Western Hajar, Jebel Akhdar, Central Desert.

#### ***Ischnura fountaineae* Morton, 1905**

Western Hajar: Individuals Mahadah area (Reimer 2009; Reimer et al. 2009).

Apparent status: Local, Western Hajar.

#### ***Ischnura nursei* Morton, 1907**

Eastern Hajar: One 18 Dec 2003 (Kunz 2015).

#### ***Ceragrion glabrum* (Burmeister, 1839)**

Greater Muscat: 3 sites (SD). 1 site (Weide & Kalkman

2008). OO: 1 site 12 Apr 1996 (EE), 1 site (Wiprächtiger 2010). Western Hajar: 3 sites (Feulner 1999, Reimer et al. 2009). 1 site (Giles 1998). Jebel Akhdar: 1 site (WP). 2 sites (SD). Eastern Hajar: 1 site (WP).

Apparent status: Locally common, Greater Muscat and Hajar mountains.

#### ***Pseudagrion decorum* (Rambur, 1842)**

Greater Muscat: 2 sites (Schneider & Ikemeyer 2016). CC: Yiti 27 Dec 2013; W. Mayh 27\* Dec 2014, 14 Feb 2015. OO: 1 site (Wiprächtiger 2010), 1 site 15 May 2015 (EE). Western Hajar CC: Fizh 15 Jan 2016. Jebel Akhdar: 1 site (WP). 3 sites (SD). Common Hoota pool\* (CC 2015). CC: W. Abyad 3 Dec 2015; Nakhal 14 Mar 2015; Hamra 27 Nov 2015; Birkat hotel 24 Mar, 3, 21 Apr 2014, 7, 22 Mar 2015. Eastern Hajar: 2 sites (WP). 3 sites (SD). CC: Bidbid 20 Feb, 20 Nov 2015; W. Bani Khalid 18 Apr, 9\* Jun 2014, 25\* Mar 2015; Khor Qurayyat 29 Mar, 19 May 2016; W. Dayqah 26 Dec 2014, 23 Dec 2015; Siwayh 29 Mar 2016; W. Tiwi 26 Apr 2012, 20 Sep, 29 Dec 2013, 10 Jun, 28 Nov 2014, 27 Aug 2015, 30 Mar 2016; W. Rafsah 31 Mar 2016.

Apparent status: Common, Hajar mountains and Greater Muscat.

#### **Platycnemididae**

##### ***Arabicnemis caerulea* Waterston, 1984**

Western Hajar: 1 site (Franković 2012). CC: W. Ahin 2 Sep 2014, 6 Jun 2016. Jebel Akhdar: 1 site (WP). 1 site (SD). 1 site (Schneider & Ikemeyer 2016). CC: Alia 4 Dec 2015 (Image 3); W. Abyad 19 Sep 2014, 3\* Dec 2015. OO: 1 site (Wiprächtiger 2010). Eastern Hajar: 1 site (WP). 1 site (SD). CC: Bidbid 20 Nov 2015; Tool 7 May 2009; W. Bani Khalid 18 Apr, 9\* Jun (Image 4) 2014, 25\* Mar 2015; Siwayh 29\* Mar 2016; W. Tiwi 20 Sep, 27\* Dec 2013, 10 Jun, 28\* Nov 2014, 30\* Mar 2016. OO: 1 site\* (Wiprächtiger 2010), 1 site (Allodonata/P. Benstead), 1 site (Allodonata/no photographer name given).

Apparent status: Locally common, Hajar mountains.

#### **Disparoneuridae**

##### ***Arabineura khalidi* (Schneider, 1988)**

Musandam & Madha: 1 site\* Madha (Wilson 2008). Western Hajar: 1 site (SD). 1 site\* (Franković 2012). Jebel Akhdar: 2 sites (SD). 1 site (Schneider & Ikemeyer 2016). CC: W. Abyad 3 Dec 2015; Birkat hotel 15 Apr 2014. OO: 1 site\* (Wiprächtiger 2010), 1 site (DR). Eastern Hajar: 1 site (SD). CC: W. Bani Khalid 18 Apr (Image 5), 9 Jun 2014, 25 Mar 2015; Siwayh 29 Mar 2016; W. Tiwi 10 Jun 2014 (Image 6); W. Rafsah 31 Mar 2016.

Apparent status: Locally common, Hajar mountains.

#### **Anisoptera dragonflies**

#### **Aeshnidae**

##### ***Anax imperator* Leach, 1815**

Musandam & Madha: 1 site Madha (Wilson 2008). Greater Muscat: 1 site (WP). 2 sites (SD). 2 sites (Schneider & Ikemeyer 2016). CC: Qurum 20 Dec 2013; Yiti 14 Feb 2015; W. Mayh 27\* Dec 2014, 14 Feb 2015. Western Hajar: 1 site (Franković 2012). CC: Abul 14\* Jan 2016; W. Ahin 21\*, 22\* Feb 2014, 16 Jan 2016. Jebel Akhdar: 3 sites (WP). 4 sites (SD). Common Hoota pool\* (CC 2015). 2 sites (Schneider & Ikemeyer 2016). CC: W. Abyad 3 Dec 2015; Nakhal 14 Mar 2015; Hamra 15\* Apr 2016; Zakt 25\* Apr, 31 May 2014; Nizwa 6 Mar 2015; Nizwa hotel 14 Jan, 5 Sep 2013, 1 Mar 2014; Birkat hotel 25 Feb, 2\*, 14 Dec 2014, 12\* Apr 2016; W. Qtm 23 Nov 2013, 24\*, 25 Aug 2014, 18\* Apr 2016. OO: 1 site 23\* Nov 2013 (DR). Eastern Hajar CC: Bidbid 31\* May, 1\* Jun 2015; Rakiya 13 Dec 2013; Tool 7 May 2009; W. Bani Khalid 9\* Jun 2014; Khor Qurayyat 19 May 2016; W. Dayqah 23 Dec 2015; Siwayh 29\* Mar 2016; W. Tiwi 20\* Sep 2013, 10\* Jun, 28 Nov 2014, 27, 28 Aug 2015, 30\* Mar 2016; W. Rafsah 31 Mar 2016. East Coast CC: Duqm hotel 13 Jan 2015.

Apparent status: Widespread, common. Not recorded in the Batinah or Central Desert.

##### ***Anax parthenope* (Selys, 1839)**

Greater Muscat: 3 sites (WP). 1 site (SD). 1 site (Weide & Kalkman 2008). 1 site (Schneider & Ikemeyer 2016). OO: 1 site (EE). Western Hajar: 1 site\* (Franković 2012). Jebel Akhdar: 2 sites (SD). Rare Hoota pool\* (CC 2015). 1 site (Schneider & Ikemeyer 2016). CC: Hoota pool 1 Oct 2014.

Apparent status: Uncommon, perhaps mainly restricted to Greater Muscat and Jebel Akhdar. Not recorded from Musandam & Madha, Batinah, Eastern Hajar, East Coast or Central Desert.

##### ***Anax tristis* Hagen, 1867**

Central Desert: One 5 Nov 1992 (SD).

##### ***Anax ephippiger* (Burmeister, 1839)**

Greater Muscat: 2 sites (WP). 5 sites (SD). 1 site (Schneider & Ikemeyer 2016). CC: Qurum 28 Dec 2013; W. Mayh 27\* Dec 2014. OO: 1 site (EE). Jebel Akhdar: 1 site (WP). 1 site (SD). 1 site (Schneider & Ikemeyer 2016). CC: Birkat hotel 15 Aug 2015. Eastern Hajar: 1 site (SD). CC: W. Tiwi 28 Nov 2014. East Coast: 1 site (WP). 3 sites (SD). 1 site (Weide & Kalkman 2008). CC: Rumayli 27 (Image 7), 30 Nov 2013; Khor Durf 15 Jan 2015. Central

**Table 2. Sites in northern and central Oman, organised by geographic region, at which the authors recorded odonates. The right-hand column presents the odonate species recorded by the authors at the site and number of visits. J. = Jebel, W. = Wadi.**

<b>Region 1: Musandam &amp; Madha</b> (no visits)	
<b>Region 2: Greater Muscat</b>	
Sultan Qaboos University (SQU), 23.5896°N & 58.1638°E, pool, 70m elevation.	<i>Ischnura evansi</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (1 visit)
Qurum, 23.6160 N & 58.4822 E, waste ground and pools beneath road viaduct, 10m	<i>Ischnura evansi</i> , <i>Anax imperator</i> , <i>A. ephippiger</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Pantala flavescens</i> (6 visits)
Barr al Jissah hotel, 23.5500 N & 58.6610 E, gardens, 20m	<i>Sympetrum fonscolombii</i> (1 visit)
Yiti, 23.5288 N & 58.6616 E, pools, 5m	<i>Ischnura senegalensis</i> , <i>Pseudagrion decorum</i> , <i>Anax imperator</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> (6 visits)
W. Mayh, 23.4100 N & 58.5248 E, pools, 145m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Anax imperator</i> , <i>A. ephippiger</i> , <i>Lindenia tetrphylla</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Diplacodes lefebvrii</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (4 visits)
<b>Region 3: Batinah</b> (no records)	
<b>Region 4: Western Hajar</b>	
Khatwa, 24.3168 N & 56.1228 E, traditional palmerie with fields, aflaj, falaj pool, 670m	<i>Crocothemis erythraea</i> (1 visit)
Abul, 24.4328 N & 56.0492 E, village edge, rocky stream, pools, 550m	<i>Anax imperator</i> , <i>Orthetrum chrysostigma</i> , <i>Trithemis arteriosa</i> , <i>T. kirbyi</i> (1 visit)
Fizh, 24.5143 N & 56.46267 E, wadi flooded area, 110m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Paragomphus sinaiticus</i> , <i>Orthetrum chrysostigma</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (2 visits)
W. Ahin, 23.9615 N & 56.4728 E, stream in wide rocky wadi, 510m	<i>Arabicnemis caerulea</i> , <i>Anax imperator</i> , <i>Paragomphus genei</i> , <i>P. sinaiticus</i> , <i>Orthetrum chrysostigma</i> , <i>O. ransonnetii</i> , <i>Crocothemis erythraea</i> , <i>Trithemis arteriosa</i> , <i>T. kirbyi</i> (6 visits)
<b>Region 5: Jebel Akhdar</b>	
W. Hawqain, 23.5093 N & 57.3288 E, spring, pools, algal mats in gravel wadi, 280m	<i>Trithemis arteriosa</i> , <i>T. kirbyi</i> (1 visit)
Alia, 23.1802 N & 57.6467 E, palmerie, earthen falaj, track with temporary pools, 875m	<i>Arabicnemis caerulea</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (1 visit)
W. Abyad, 23.4132 N & 57.6678 E, rocky gravel wadi, pools, 300m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Arabicnemis caerulea</i> , <i>Arabineura khalidi</i> , <i>Anax imperator</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Diplacodes lefebvrii</i> , <i>Trithemis arteriosa</i> , <i>T. kirbyi</i> , <i>Zygonyx torridus</i> (2 visits)
Nakhal, 23.3760 N & 57.8275 E, hot springs (Ayn Athawwarah) outflow stream, 350m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Anax imperator</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (2 visits)
J. Shams, 23.2372 N & 57.1500 E, picnic site, 1450m	<i>Orthetrum chrysostigma</i> , <i>Sympetrum fonscolombii</i> , <i>Trithemis kirbyi</i> , <i>Pantala flavescens</i> (6 visits)
Jabrin, 22.9155 N & 57.2493 E, falaj at castle, 525m	<i>Trithemis annulata</i> (2 visits)
Hamra, 23.1060 N & 57.2922 E, temporary pools, wetland, falaj near palmerie, 660m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Anax imperator</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Diplacodes lefebvrii</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (9 visits)
Hoota pool, 23.0710° N & 57.3680 E, wadi pool (Cowan & Cowan 2013, 2015), 670m	Novel/unusual observations post Cowan & Cowan 2015: <i>Anax parthenope</i> , <i>Sympetrum fonscolombii</i> , <i>Pantala flavescens</i> (51 visits) [Cowan & Cowan 2015: <i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Anax imperator</i> , <i>A. parthenope</i> , <i>Paragomphus genei</i> , <i>P. sinaiticus</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Diplacodes lefebvrii</i> , <i>Trithemis annulata</i> , <i>T. arteriosa</i> , <i>T. kirbyi</i> , <i>Pantala flavescens</i> (68 visits)]
Tanuf, 23.0532 N & 57.4688 E, wadi ford (occasional stream), falaj, 575m	<i>Orthetrum chrysostigma</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (2 visits)
Zakt, 23.0895 N & 57.4317 E, temporary pools, silt flat, 1315–1400m	<i>Anax imperator</i> , <i>Orthetrum chrysostigma</i> , <i>Crocothemis erythraea</i> , <i>Sympetrum fonscolombii</i> , <i>Trithemis arteriosa</i> , <i>T. kirbyi</i> , <i>Pantala flavescens</i> , <i>Zygonyx torridus</i> (12 visits)
Nizwa, 22.9720 N & 57.5490 E, Falaj Daris park (falaj, gardens), 550m	<i>Anax imperator</i> , <i>Paragomphus genei</i> , <i>Orthetrum chrysostigma</i> , <i>Orthetrum sabina</i> , <i>Trithemis annulata</i> (7 visits)
Nizwa hotel, 22.8957° N, 57.5308 E, swimming pools, gardens, 500m	<i>Ischnura evansi</i> , <i>Anax imperator</i> , <i>Orthetrum sabina</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (4 visits)
Birkat hotel, 22.9248° N, 57.6183 E, swimming pool, gardens, 560m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Arabineura khalidi</i> , <i>Anax imperator</i> , <i>A. ephippiger</i> , <i>Paragomphus sinaiticus</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> , <i>Pantala flavescens</i> (80 visits)
Birkat, 22.9258 N & 57.7333 E, falaj, palmerie near fort, old village ruins, 600m	<i>Orthetrum chrysostigma</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> (2 visits)
Alila hotel (upper Saiq plateau), 23.1432 N & 57.5325 E, gardens, swimming pool overflow, 1925m	<i>Crocothemis erythraea</i> (1 visit)
Daan al Bisaytin (upper Saiq plateau), 23.1316 N & 57.5962 E, temporary pool, 2300m	<i>Sympetrum fonscolombii</i> , <i>Trithemis kirbyi</i> (3 visits)
Khab Mahlab (upper Saiq plateau), 23.1227 N & 57.6157 E, temporary pool by large junipers, 2320m	<i>Sympetrum fonscolombii</i> (1 visit)
W. Qtm (lower Saiq plateau), 23.0728 N & 57.6277 E, falaj, pools, 1970m	<i>Ischnura evansi</i> , <i>Anax imperator</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis arteriosa</i> , <i>T. kirbyi</i> , <i>Zygonyx torridus</i> (7 visits)

Al Ayn (lower Saiq plateau), 23.0735 N & 57.6622 E, falaj, gardens, 1950m	<i>Pantala flavescens</i> (2 visits)
Manakhir (lower Saiq plateau), 23.0743 N & 57.7135 E, small reservoir, 1910m	<i>Trithemis kirbyi</i> (1 visit)
<b>Region 6: Eastern Hajar</b>	
Bidbid, 23.4053 N & 58.1180 E, wadi pools, streams, falaj by fort, 220m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Arabicnemis caerulea</i> , <i>Anax imperator</i> , <i>Paragomphus sinaiticus</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (9 visits)
Mizbar, c.23.1167 N & 58.3666 E, temporary rocky pools in wet wadi, c.400m	<i>Trithemis arteriosa</i> , <i>T. kirbyi</i> (1 visit)
Rakiya, 23.0472 N & 58.5748 E, rocky pools, palmerie (west end of W. Kabbah), 310m	<i>Anax imperator</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis kirbyi</i> (1 visit)
Tool, 23.0185 N & 58.7303 E, wadi pool/streams, palmerie (central W. Kabbah), 370m	<i>Arabicnemis caerulea</i> , <i>Anax imperator</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (1 visit)
Ibra hotel, 22.6517 N & 58.6030 E, swimming pool, garden, 430m	<i>Paragomphus sinaiticus</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis kirbyi</i> (3 visits)
W. Bani Khalid, 22.6188 N & 59.0935 E, wadi pools, aflaj, palmeries, 645m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Arabicnemis caerulea</i> , <i>Arabineura khalidi</i> , <i>Anax imperator</i> , <i>Lindenia tetraphylla</i> , <i>Paragomphus genei</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. arteriosa</i> , <i>T. kirbyi</i> , <i>Macrodiplax cora</i> , <i>Zygonyx torridus</i> (4 visits)
Khor Qurayyat, 23.2750 N & 58.9133 E, brackish lagoon, mangroves, 15m	<i>Ischnura senegalensis</i> , <i>Pseudagrion decorum</i> , <i>Anax imperator</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Diplacodes lefebvrii</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> , <i>Macrodiplax cora</i> , <i>Selysiotthemis nigra</i> (2 visits)
W. Dayqah, 23.0840 N & 58.8495 E, rocky pools by palmerie (below dam), 140m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Anax imperator</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. kirbyi</i> (3 visits)
Siwayh (W. Arbiyyan), 23.0345 N & 58.9912 E, rocky pools, fast stream, low waterfall, 140m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Arabicnemis caerulea</i> , <i>Arabineura khalidi</i> , <i>Anax imperator</i> , <i>Lindenia tetraphylla</i> , <i>Trithemis annulata</i> , <i>T. arteriosa</i> , <i>T. kirbyi</i> , <i>Zygonyx torridus</i> (1 visit)
Shaab hotel, 22.8513 N & 59.2368 E, garden, 30m	<i>Pantala flavescens</i> (1 visit)
W. Tiwi, 22.8047 N & 59.2457 E, pools, fast flowing rocky stream, 35m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Arabicnemis caerulea</i> , <i>Arabineura khalidi</i> , <i>Anax imperator</i> , <i>A. ephippiger</i> , <i>Lindenia tetraphylla</i> , <i>Paragomphus sinaiticus</i> , <i>Orthetrum chrysostigma</i> , <i>O. sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>T. arteriosa</i> , <i>T. kirbyi</i> , <i>Urothemis thomasi</i> (9 visits)
W. Rafsah, 22.4857 N & 59.3867 E, stream (beneath viaduct), 80m	<i>Ischnura evansi</i> , <i>Pseudagrion decorum</i> , <i>Arabineura khalidi</i> , <i>Anax imperator</i> , <i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>Urothemis thomasi</i> (1 visit)
<b>Region 7: East Coast</b>	
Sur, 22.5837 N & 59.4617 E, mature sewage works pools, 15m	<i>Ischnura evansi</i> , <i>Lindenia tetraphylla</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Diplacodes lefebvrii</i> (1 visit)
Rumayli, 20.3278 N & 57.7898 E, pools in rocky wadi, 70m	<i>Ischnura evansi</i> , <i>I. senegalensis</i> , <i>Anax ephippiger</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Pantala flavescens</i> , <i>Urothemis thomasi</i> (4 visits)
Duqm hotel, 19.5700° N, 57.7018 E, swimming pool, gardens, 40m	<i>Anax imperator</i> , <i>Pantala flavescens</i> (3 visits)
Khor Durf, 18.9370 N & 57.3440 E, brackish lagoon, mangroves, 20m	<i>Ischnura senegalensis</i> , <i>Anax ephippiger</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Diplacodes lefebvrii</i> , <i>Pantala flavescens</i> , <i>Macrodiplax cora</i> (6 visits)
<b>Region 8: Central Desert</b>	
Bashaer, c.22.5500 N & 57.6500 E, small pools in wadi, c.320m	<i>Crocothemis erythraea</i> (1 visit)
Natih, 22.4927 N & 56.6568 E, small pools, oasis, livestock tank, 230m	<i>Ischnura evansi</i> , <i>Orthetrum sabina</i> , <i>Pantala flavescens</i> (7 visits)
Arff, 22.4757 N & 56.8172 E, small pools, seepage, borehole overflow, 250m	<i>Ischnura evansi</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Diplacodes lefebvrii</i> , <i>Pantala flavescens</i> (5 visits)
Raki, 22.3095 N & 57.4383 E, wells, pools, 315m	<i>Crocothemis erythraea</i> , <i>Trithemis annulata</i> , <i>Pantala flavescens</i> (1 visit)
Naama pools, 22.0637 N & 57.7367 E, wadi pools, 210m	<i>Ischnura evansi</i> , <i>Lindenia tetraphylla</i> , <i>Orthetrum sabina</i> , <i>Crocothemis erythraea</i> , <i>Trithemis kirbyi</i> (2 visits)

Desert: 2 sites (SD).

Apparent status: Widespread, uncommon, perhaps only invasive immigrant.

### Gomphidae

#### *Lindenia tetraphylla* (Vander Linden, 1825)

Greater Muscat: 1 site (SD). CC: W. Mayh 14 Feb

2015. Jebel Akhdar: 1 site (WP). 1 site (Giles 1998). Eastern Hajar: 2 sites (WP). 1 site (SD). CC: W. Bani Khalid 18 Apr (Image 8), 9\* Jun 2014, 25\* Mar 2015; Siwayh 29 Mar 2016; W. Tiwi 20 Sep 2013 (Image 9), 10 Jun 2014, 30 Mar 2016. East Coast: CC: Sur 30\* Mar 2016. Central Desert CC: Naama pools 2 Apr, 28 May 2016.

Apparent status: Widespread, locally common. Not



recorded from Musandam & Madha, Batinah or Western Hajar.

***Paragomphus genei* (Selys, 1841)**

Greater Muscat: 1 site (SD). Western Hajar: 1 site\* (Feulner et al. 2007). CC: W. Ahin 16 Jan 2016. Jebel Akhdar: 1 site (WP). 4 sites (SD). Rare Hoota pool (CC 2015). 2 sites (Schneider & Ikemeyer 2016). CC: Nizwa 6 Mar 2015, 18 Jan 2016. Eastern Hajar: 2 sites (SD). CC: W. Bani Khalid 18 Apr, 9 Jun 2014, 25 Mar 2015.

Apparent status: Locally common Hajar mountains.

***Paragomphus sinaiticus* (Morton, 1929)**

Musandam & Madha: 1 site Madha (Wilson 2008). Greater Muscat: 1 site (SD). Western Hajar: 1 site (Franković 2012). CC: Fizh 7 Jun 2016; W. Ahin 22 Feb 2014. Jebel Akhdar: 2 sites (SD). Fairly common Hoota pool (CC 2015). 1 site (Schneider & Ikemeyer 2016). CC: Birkat hotel 9, 22 Nov, 5, 10, 12\* Dec 2009, 19, 28 Mar, 24 Sept, 10, 16 Oct, 17 Nov 2010, 19 Mar, 4, 16 Apr, 12, 14, 16 Nov 2011, 29 Feb, 4 Mar, 4 Apr 2012, 29 Mar, 10 Oct, 2, 23 Dec 2013, 25 Feb, 12, 24 Mar, 1, 15, 24 Apr, 8 Sep, 12 Oct, 16 Nov, 8 Dec 2014, 7, 26 Mar 2015. Eastern Hajar: 1 site (WP). 1 site (SD). CC: Bidbid 20 Feb, 13 Mar 2015; Ibra hotel 18 Apr 2014; W. Tiwi 28 Nov 2014. OO: 1 site (Wiprächtiger 2010).

Apparent status: Locally common. Not recorded from Batinah, East Coast or Central Desert.

**Libellulidae**

***Orthetrum chrysostigma* (Burmeister, 1839)**

Musandam & Madha: 1 site Madha (Wilson 2008). Greater Muscat: 3 sites (WP). 2 sites (SD). 1 site (Schneider & Ikemeyer 2016). CC: W. Mayh 28 Dec 2014, 14 Feb 2015. Western Hajar: 1 site (Franković 2012). CC: Abul 14 Jan 2016; Fizh 7\* Jun 2016; W. Ahin 21, 22 Feb 2014, 16 Jan 2016. Jebel Akhdar: 5 sites (WP). 9 sites (SD). Common Hoota pool\* (CC 2015). 2 sites (Schneider & Ikemeyer 2016). CC: Alia 4\* Dec 2015; W. Abyad 19 Sep 2014; Nakhal 14 Mar 2015; J. Shams 23 Nov 2010; Hamra 26 Apr 2009, 4 Apr 2013, 27 Nov, 18 Dec 2015, 10, 15 Apr 2016; Tanuf 10 Apr 2016; Zakt 23 April 2010, 25 Apr, 31\* May 2014; Nizwa 25 Jan 2013, 6 Mar, 14 Jun, 18 Sep 2015, 18 Jan, 12\* Mar 2016; Birkat hotel 23 Nov 2010, 20, 24 Mar 2014; Birkat 1 Mar 2014; W. Qtm 17 May, 23 Nov 2013, 11\* Apr, 25 Aug 2014, 18 Apr 2016. OO: 1 site\* (DR). Eastern Hajar: 1 site (WP). 3 sites (SD). CC: Bidbid 30 Aug 2013, 20 Feb, 20 Nov 2015; Rakiya 13 Dec 2013; W. Bani Khalid 18\* Apr, 9\* Jun 2014, 25\* Mar 2015; W. Dayqah 23 Dec 2015; W. Tiwi 27 Dec 2013, 27 Aug 2015. OO: 1 site (Wiprächtiger 2010). Central

Desert: 1 site (SD).

Apparent status: Common. Not recorded from Batinah or East Coast.

***Orthetrum ransonnetii* (Brauer, 1865)**

Greater Muscat: 2 sites (WP). 2 sites (SD). Western Hajar: 1 area (Feulner et al. 2007, Reimer 2008). CC: W. Ahin 21 Feb 2014 (Image 10). OO: 1 site (Allodonata/P. Benstead). Jebel Akhdar: 1 site (WP). 1 site (Schneider & Ikemeyer 2016). Eastern Hajar: 1 site (WP).

Apparent status: Uncommon and scattered, Hajar mountains and Greater Muscat.

***Orthetrum sabina* (Drury, 1773)**

Musandam & Madha: 1 site Madha (Wilson 2008). Greater Muscat: 5 sites (WP). 7 sites (SD). 1 site (Weide & Kalkman 2008). 1 site (Schneider & Ikemeyer 2016). CC: SQU 25\* Dec 2015; Qurum 20 Dec 2013, 4 Apr, 20 Sep 2014, 22\* Aug 2015; Yiti 22 Dec 2013, 20 Sep 2014, 14\* Feb 2015, 21 May 2016; W. Mayh 28\* Dec 2014, 14\* Feb 2015. OO: 1 site (Wiprächtiger 2010). 1 site (EE). Batinah: 1 site (WP). 1 site (SD). Jebel Akhdar: 3 sites (WP). 4 sites (SD). Common Hoota pool\* (CC 2015). 2 sites (Schneider & Ikemeyer 2016). CC: Alia 4\* Dec 2015; W. Abyad 19 Sep 2014; Nakhal 19 Sep 2014, 14 Mar 2015; Hamra 27 Nov, 18\* Dec 2015, 30\* Jan, 15 Apr 2016; Nizwa 14 Jun 2015; Nizwa hotel 5 Sep 2013; Birkat hotel 27 Apr, 23, 31 Aug, 24 Sep, 16 Oct, 23 Nov 2010, 8 Jun, 21, 23 Dec 2013, 20 Mar 2014, 7\* Dec 2015, 14, 16 Mar, 11 Apr 2016; W. Qtm 11 Apr 2014, 17 Apr 2016. Eastern Hajar: 3 sites (WP). 2 sites (SD). CC: Bidbid 20 Nov 2015; Rakiya 13 Dec 2013; Ibra hotel 17, 18 Apr 2014; W. Bani Khalid 18 Apr 2014, 25 Mar 2015; Khor Qurayyat 29 Mar, 19 May 2016; W. Dayqah 23 Dec 2015; W. Tiwi 20 Sep 2013, 10 Jun 2014, 27, 28 Aug 2015. East Coast: 1 site (WP). 1 site (Weide & Kalkman 2008). CC: Sur 30 Mar 2016; Rumayli 27 Nov 2013; Khor Durf 28, 29 Nov 2013, 15 Jan, 19 Sep 2015, 2\* Jun 2016. Central Desert: 2 sites (SD). CC: Natih 16 Apr 2009, 6 Dec 2012; Arff 9 Apr 2010, 2 May 2014; Naama pools 2\* Apr, 28\* May 2016.

Apparent status: Common and widespread. Not recorded in Western Hajar.

***Orthetrum taeniolatum* (Schneider, 1845)**

Jebel Akhdar: 2 sites (Schneider & Ikemeyer 2016). Eastern Hajar: One individual 4 Oct 1977 (WP, SD).

***Orthetrum abbotti* Calvert, 1862**

Western Hajar: Two males, more than 10 females, 1 site, 13 Mar 2010 (Franković 2012).

Apparent status: Local, Western Hajar.

***Crocothemis erythraea* (Brullé, 1832)**

Musandam & Madha: One Musandam (SD). 1 site Madha (Wilson 2008). Greater Muscat: 5 sites (WP). 5 sites (SD). 1 site (Weide & Kalkman 2008). 2 sites (Schneider & Ikemeyer 2016). CC: SQU 25\* Dec 2015; Qurum 28 Dec 2013, 4 Apr 2014, 22 Aug 2015; Yiti 27 Dec 2013, 20 Sep 2014, 14\* Feb 2015, 21 May 2016; W. Mayh 27\* Dec 2014, 14 Feb 2015. Batinah OO: 1 site (Allodonata/Ton Elzerman), 1 site (JAA). Western Hajar: 1 site (Franković 2012). CC: Khatwa 14 Jan 2016; Fizh 15 Jan, 7 Jun 2016; W. Ahin 22 Feb 2014, 16 Jan, 6 Jun 2016. Jebel Akhdar: 2 sites (WP). 7 sites (SD). Common Hoota pool\* (CC 2015). 2 sites (Schneider & Ikemeyer 2016). CC: Alia 4 Dec 2015; W. Abyad 19 Sep 2014, 3 Dec 2015; Nakhla 19 Sep 2014, 14 Mar 2015; Hamra 27 Nov, 18\* Dec 2015, 30 Jan, 15 Apr 2016; Zakt 25 Apr, 31\* May 2014; Birkat hotel 19 Mar, 17, 25 May, 29 Aug, 24 Sep, 16 Oct 2010, 4, 13, 16 Apr 2011, 4 Apr 2012, 29 Mar, 8 Jun, 12 Sep, 2, 11, 23 Dec 2013, 26 Feb, 17, 20, 23, 24 Mar, 1, 15 Apr, 10 Sep, 12 Oct, 16 Nov, 2, 14 Dec 2014, 24 Feb, 17 May, 7, 28 Dec 2015, 27 Jan, 14, 16 Mar, 11 Apr 2016; Birkat 1 Mar 2014, 7 Mar 2015; Alila hotel 25 Aug 2014; W. Qtm 17 May, 23 Nov 2013, 11 Apr, 25\* Aug 2014, 25 Aug 2015, 18 Apr 2016. OO: 1 site\* (DR). Eastern Hajar: 3 sites (WP). 3 sites (SD). CC: Bidbid 30 Aug 2013, 20 Feb, 31\* May, 1 Jun, 20\* Nov 2015; Rakiya 13 Dec 2013; Tool 7 May 2009; Ibra hotel 17, 18 Apr 2014, 31 Mar 2016; W. Bani Khalid 18 Apr, 9 Jun 2014, 25 Mar 2015; Khor Qurayyat 29 Mar, 19 May 2016; W. Dayqah 26 Dec 2014, 23 Dec 2015; W. Tiwi 26 Apr 2012, 20 Sep, 27 Dec 2013, 10 Jun, 28 Nov 2014, 27, 28 Aug 2015, 30 Mar 2016; W. Rafsah 31 Mar 2016. East Coast CC: Sur 30 Mar 2016; Rumayli 27 Nov 2013, 3 Jun 2016; Khor Durf 28, 29 Nov 2013, 4 Oct 2014, 15 Jan 2015, 2 Jun 2016. Central Desert CC: Bashaer 22 Dec 2008; Arff 2 May 2014, 20\* Mar 2015, 18 Mar 2016; Raki 2 Apr 2016; Naama pools 28 May 2016.

Apparent status: Widespread and common.

***Crocothemis sanguinolenta* (Burmeister, 1839)**

Jebel Akhdar: One 21 Mar 1976 (WP). One 12 Jul 1995 (SD).

***Diplacodes lefebvreii* (Rambur, 1842)**

Greater Muscat: 1 site (WP). 4 sites (SD). 1 site (Weide & Kalkman 2008). 2 sites (Schneider & Ikemeyer 2016). CC: W. Mayh 14 Feb 2015. OO: 1 site (EE). 1 site (Wiprächtiger 2010). Batinah OO: 1 site (JAA). Western Hajar: 1 site (Franković 2012). Jebel Akhdar: 2 sites (WP).

Uncommon Hoota pool\* (CC 2015). 1 site (Schneider & Ikemeyer 2016). CC: W. Abyad 19 Sep 2014; Hamra 27 Nov, 18 Dec 2015, 15 Apr 2016. Eastern Hajar CC: Khor Qurayyat 19 May 2016. East Coast CC: Sur 30 Mar 2016; Khor Durf 15 Jan 2015. Central Desert CC: Arff 2 May 2014, 20 Mar 2015.

Apparent status: Widespread and locally common.

***Sympetrum fonscolombii* (Selys, 1840)**

Greater Muscat: 2 sites (WP). CC: Barr al Jissah hotel 13 Feb 2015. Jebel Akhdar: 1 site (Campbell & Reimer 2011). CC: J. Shams 9 Apr 2014; Hoota pool 30\* Aug 2014; Zakt 18 Mar 2010 (Image 11), 25\* Apr 2014 (Image 12); Daan al Bisaytin 24, 25 (Image 13) Aug 2014; Khab Mahlab 25 Aug 2014. East Coast: 1 site (180 seen, Campbell & Reimer 2011). OO: 1 site (Wiprächtiger 2010).

Apparent status: Uncommon, perhaps mainly sporadic immigrant. Not recorded from Musandam & Madha, Batinah, Western Hajar, Eastern Hajar or Central Desert.

***Trithemis annulata* (Palisot de Beauvois, 1807)**

Musandam & Madha: 1 site Musandam (WP). 1 site Madha (Wilson 2008). Greater Muscat: 3 sites (WP). 4 sites (SD). 1 site (Weide & Kalkman 2008). 2 sites (Schneider & Ikemeyer 2016). CC: SQU 25 Dec 2015; W. Mayh 27 Dec 2014, 14 Feb 2015. Batinah: 1 site (WP). 1 site (SD). 1 site (Weide & Kalkman 2008). Western Hajar CC: Fizh 15 Jan, 7 Jun 2016. Jebel Akhdar: 3 sites (WP). 7 sites (SD). Common Hoota pool\* (CC 2015). CC: Alia 4 Dec 2016; Nakhla 19 Sep 2014, 14 Mar 2015; Jabrin 10, 19 Apr 2016; Hamra 14 Apr 2013, 27 Nov, 18 Dec 2015, 30 Jan, 10\* Apr 2016; Tanuf 10 Apr 2016; Nizwa 4 Nov 2012, 25 Jan 2013, 6 Mar, 14 Jun, 18 Sep 2015, 18 Jan, 12 Mar 2016; Nizwa hotel 5 Sept 2013; Birkat hotel 3, 13, 22 Nov 2009, 8 Jun, 28 Sep 2013; Birkat 1 Mar 2014, 7 Mar 2015. Eastern Hajar: 2 sites (WP). 4 sites (SD). CC: Bidbid 19 May 2010, 30 Aug 2013, 31 May, 1 Jun, 20 Nov 2015; Tool 7 May 2009; W. Bani Khalid 18 Apr, 9 Jun 2014, 25 Mar 2015; Khor Qurayyat 29 Mar, 19 May 2016; W. Dayqah 26 Dec 2014, 23 Dec 2015; Siwayh 29 Mar 2016; W. Tiwi 26 Apr 2012, 20 Sep 2013, 27 Jan, 10 Jun, 28 Nov 2014, 27, 28 Aug 2015, 30 Mar 2016; W. Rafsah 31 Mar 2016. OO: 2 sites (Wiprächtiger 2010). Central Desert CC: Raki 2 Apr 2016.

Apparent status: Widespread and common. Not recorded from East Coast.

***Trithemis arteriosa* (Burmeister, 1839)**

Musandam & Madha: 1 site Madha (Wilson 2008).

Greater Muscat: 3 sites (SD). Batinah: 1 site (SD). Western Hajar: 1 site (SD). One site (Franković 2012). CC: Abul 14 Jan 2016; W. Ahin 21, 22 Feb 2014, 16 Jan 2016, 6 Jun 2016. Jebel Akhdar: 2 sites (WP). 6 sites (SD). Fairly common Hoota pool (CC 2015). CC: W. Hawqain 24 Dec 2015; W. Abyad 3 Dec 2015; Zakt 25 Apr, 2 Jun 2014; W. Qtm 17 May, 23 Nov 2013, 11 Apr, 25 Aug 2014, 5 Jun 2015, 18 Apr 2016. OO: 1 site (Wiprächtiger 2010). 1 site (EE). 2 sites (DR). Eastern Hajar: 1 site (WP). CC: Mizbar 26 Mar 2010; W. Bani Khalid 9 Jun 2014; Siwayh 29 Mar 2016; W. Tiwi 26 Apr 2012, 20 Sep, 27 Dec 2013, 10 Jun 2014, 27, 28 Aug 2015, 30 Mar 2016.

Apparent status: Widespread and fairly common, Hajar mountains.

#### ***Trithemis kirbyi* Selys, 1891**

Musandam & Madha: 1 site Madha (Wilson 2008). Greater Muscat: 4 sites (WP). 4 sites (SD). CC: SQU 25 Dec 2015; W. Mayh 27 Dec 2014, 14 Feb 2015. OO: 1 site (Wiprächtiger 2010). 1 site (EE). Batinah: Occurs Dimaniyat islands (Carlisle 2014). Western Hajar: 1 site (Franković 2012). CC: Abul 14 Jan 2016; Fizh 15 Jan, 7 Jun 2016; W. Ahin 21, 22 Feb, 2 Sep 2014, 16 Jan, 6 Jun 2016. OO: 1 site (EE). Jebel Akhdar: 2 sites (WP). 12 sites (SD). Very common Hoota pool\* (CC 2015). 1 site (Schneider & Ikemeyer 2016). CC: W. Hawqain 24 Dec 2015; Alia 4 Dec 2015; W. Abyad 3 Dec 2015; Nakhal 19 Sep 2014, 14 Mar 2015; J. Shams 23 Apr, 13 May 2010, 11 Jun 2016; Hamra 4 Apr 2013, 27 Nov, 18 Dec 2015, 30 Jan, 15 Apr 2016; Tanuf 10, 19 Apr 2016; Zakt 18 Mar, 2 Apr, 7 May 2010, 25 Apr, 31 May, 2 Jun 2014; Nizwa hotel 6 Oct 2013; Birkat hotel 7 Apr, 9, 17, 19 May, 31 Aug (being eaten by an *Orthetrum sabina*) 2010, 11 Mar, 23 Apr, 2, 14 Dec 2014; Daan al Bisaytin 18 Mar 2011; W. Qtm 18 Mar, 7 Apr 2011, 17 May, 23 Nov 2013, 11 Apr 2014, 18 Apr 2016; Manakhir 7 Apr 2011. Eastern Hajar: 2 sites (WP). CC: Bidbid 30 Aug 2013, 20 Feb, 13 Mar, 31 May, 1 Jun, 20 Nov 2015; Mizbar 26 Mar 2010; Rakiya 13 Dec 2013; Tool 7 May 2009; Ibra hotel 17, 18 Apr 2014; W. Bani Khalid 18 Apr, 9 Jun 2014, 25 Mar 2015; Khor Qurayyat 19 May 2016; W. Dayqah 28 Nov, 26 Dec 2014, 23 Dec 2015; Siwayh 29 Mar 2016; W. Tiwi 28 Apr 2012, 20 Sep 2013, 10 Jun, 21 Nov 2014, 28 Aug 2015. OO: 1 site (Wiprächtiger 2010). Central Desert CC: Naama pools 29 May 2016.

Apparent status: Commonest odonate. Not recorded from East Coast.

#### ***Trithemis pallidinervis* (Kirby, 1889)**

Greater Muscat: One 29 Nov–1 Dec 1976 (WP, SD).

#### ***Pantala flavescens* (Fabricius, 1798)**

Musandam & Madha: 1 site Musandam (SD). Greater Muscat: 1 site (WP). 2 sites (SD). 1 site (Weide & Kalkman 2008). CC: Qurum 20 Dec 2013, 20 Sep 2014. Batinah: 2 sites (Weide & Kalkman 2008). Western Hajar: 1 site (Franković 2012). Jebel Akhdar: 7 sites (SD). Uncommon Hoota pool (CC 2015). CC: J. Shams 11 Jun 2016; Hoota pool 19\* Aug, 9\* Sep 2015, 22\* Feb 2016; Zakt 27 Sep 2013, 25 Apr, 31\* May, 6\*, 27 Sep 2014, 11\* Sep 2015; Birkat hotel 4 Nov 2010, 17, 25 Feb, 2, 11 Sep, 12 Oct, 2, 4, 8 Dec 2014; Al Ayn 5, 6 Jun 2015. Eastern Hajar CC: Shaab hotel 20 Sep 2013. East Coast: 6 sites (Weide & Kalkman 2008). CC: Rumayli 27 Nov 2013; Duqm hotel 13 Jan 2013, 1 Jun 2016; Khor Durf 29 Nov 2013, 15 Jan 2015, 2 Jun 2016. Central Desert: 4 sites (SD). CC: Natih 6 Sep 2013; Arff 7 Sep 2013, Raki 2 Apr 2016.

Apparent status: Widespread. Perhaps mainly immigrant with sporadic local reproduction.

#### ***Tamea basilaris* (Palisot de Beauvois, 1817)**

Greater Muscat: One 30 Dec 1977 (WP). Five 5 Apr 2012 (Schneider & Ikemeyer 2016). Central Desert: Four 5 Nov 1992 (SD).

#### ***Tamea limbata* (Desjardins, 1832)**

Central Desert: One 5 Nov 1992 (SD).

#### ***Macrodiplax cora* (Kaup in Brauer, 1867)**

Batinah: 1 site (Reimer et al. 2009). Eastern Hajar CC: W. Bani Khalid 18 Apr 2014; Khor Qurayyat 29 Mar 2016 (Image 14). East Coast CC: Khor Durf 28, 29 (Image 15) Nov 2013, 4\* Oct 2014 (Image 16), 15 Jan, 19 Sep 2015, 2 Jun 2016 (Image 17).

Apparent status: Mainly coastal. Resident at Khor Durf and perhaps uncommon/rare or sporadic elsewhere.

#### ***Selysiothemis nigra* (Vander Linden, 1825)**

Greater Muscat: Two 1 Jul 1995 (SD). 1 site (Schneider & Ikemeyer 2016). Batinah OO: 1 site (JAA). Jebel Akhdar: 1 site (Schneider & Ikemeyer 2016). Eastern Hajar CC: Khor Qurayyat 19 May 2016 (Image 18). East Coast: One 24 Feb 1976 (WP).

Apparent status: Rare visitor.

#### ***Urothemis thomasi* Longfield, 1932**

Greater Muscat: 1 site (SD). Eastern Hajar: 2 sites (SD). CC: W. Tiwi 28 Nov 2014 (Image 19, 20); W. Rafsah 31 Mar 2016 (Image 21). East Coast CC: Rumayli 3 Jun 2016.

Apparent status: Rare and local, Greater Muscat to East Coast.

***Zygonyx torridus* (Kirby, 1889)**

Western Hajar: 1 site (Franković 2012). Jebel Akhdar: 2 sites (SD). 1 site (Schneider & Ikemeyer 2016). CC: W. Abyad 3 Dec 2015 (Image 22); Zakt 31 May 2014; W. Qtm 17 May 2013. Eastern Hajar: 1 site (WP). CC: W. Bani Khalid 9 Jun 2014; Siwayh 29 Mar 2016 (Image 23).

Apparent status: Rare, perhaps local.

**DISCUSSION**

Of the 44 species from Oman, 36 have been recorded in northern and central Oman (eight zygopteran and 28 anisopteran species). All the species are assessed as Least Concern as per the IUCN global Red List categories except *Arabineura khalidi* and *Urothemis thomasi*, both Endangered, and *Paragomphus sinaiticus*, Near Threatened (IUCN 2016). The new records increase relevant knowledge of these threatened or near threatened species. Of the 36 species, four have been recorded in northern and central Oman on one occasion only and not in the last twenty years, namely *Agriocnemis pygmaea*, *Anax tristis*, *Trithemis pallidinervis* and *Tramea limbata*. *Arabineura khalidi* seem to be endemic to the Hajar mountains of Oman and the United Arab Emirates (Schneider & Dumont 1997). Our two records of *Urothemis thomasi* in the Eastern Hajar are geographically close to Schneider & Dumont (1997)'s records there. Our third record was much further south, in the East Coast region.

There are few odonate records for Musandam (Region 1) perhaps because of scarce surface water (Feulner 2011). The closeness of Iran might result in some interesting records there (Heidari & Dumont 2002; Schneider & Dumont 2015). The Batinah (Region 3) is under-recorded. There appear to be relatively few wetland sites in the Central Desert (Region 8). The distribution of *Orthetrum abbotti* requires further investigation. Boulaaba et al. (2014) recorded nine species of odonates, from larvae, in the Western Hajar including the presumably misidentified *Boyeria irene* (Fonscolombe, 1838) and *Macromia splendens* (Pictet, 1834 [sic]). We ignored their records. Barry & Roberts (2014) used final instar larvae of three odonate species caught in Greater Muscat but gave no identification details.

The odonate fauna of northern and central Oman is now fairly well known. There are, however, still identification problems in the field (i.e., from photographs) that require correlation of specimen characters with field characters. Separation of female

*Ischnura evansi* from female *I. senegalensis* needs investigation, a problem made more difficult by the existence of various female morphs (e.g., Feulner 2012). Confident identification of *Ischnura fountaineae* from photographs seems a challenge (e.g., Grunwell 2010, 2012). Reimer et al. (2009) considered that the blue of the thorax is the same sky-blue as that of the 'tail-light'. Unfortunately, this is not clear in their accompanying photograph. Observations of appendages and prothorax, under magnification, of freshly caught individuals seems unavoidable. There are various odonate species recorded from the Arabian peninsula but not identified in Oman (Schneider & Krupp 1993) that are also good candidates for this treatment. The study of identification criteria for the last instar larvae/exuviae of the odonates of the Arabian peninsula is underway (Chelmick et al. 2016). There are plenty of opportunities to find and investigate more water bodies in northern and central Oman.

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Image 1. *Ischnura senegalensis*: mating wheel, Khor Qurayyat 29 March 2016.



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Image 2. *Ischnura senegalensis*: male, Rumayli, 30 November 2013. Note S1-3 (proximal abdominal segments) dark saddle with light-coloured 'blue to green dots' either side.



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Image 4. *Arabicnemis caerulea*: flying in tandem, Wadi Bani Khalid 9 June 2014.



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Image 3. *Arabicnemis caerulea*: male, Alia (Jebel Akhdar), 4 December 2015. Powder blue (even-colouration throughout).



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Image 5. *Arabineura khalidi*: Wadi Bani Khalid, 18 April 2014. Typical high stance 'on tiptoes'. Well-separated dark eyes. Pale markings on thorax.



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Image 6. *Arabineura khalidi*: immature Wadi Tiwi, 10 June 2014.



Image 7. *Anax ephippiger* male, Rumayli, 27 November 2013. Bright pale-blue saddle, brown eyes and pointed upper anal appendages. Wider black dorsal bands with pale brown paired spots on S8–S10 of abdomen.



Image 8. *Lindenia tetraphylla*: Wadi Bani Khalid, 18 April 2014. Separated eyes. Stripey thorax. Abdomen pale marked with black and dark brown. Wings clearly marked with dark veins.



Image 9. *Lindenia tetraphylla*: Wadi Tiwi, 20 September 2013. Long slender abdomen thickened at end with 'flaps' at segments 7–8. Pointed anal appendages give bladetail effect.



Image 10. *Orthetrum ransonnetii*: male, Wadi Ahin, 21 February 2014. Straight unwaisted abdomen. Hind wing bases clear. Photo under magnification shows black antenodal subcrossveins and upper part of eyes brown.



Image 11. *Sympetrum fonscolombii*, Zakt, 18 March 2010. Black, yellow-striped, legs, wide irregular stripe on thorax, black-outlined pterostigmas.



Image 12. *Sympetrum fonscolombii*: ovipositing in tandem at temporary pool, Zakt, 25 April 2014.



Image 13. *Sympetrum fonscolombii*: male, Daan al Bisaytin (upper Saiq plateau), 25 August 2014. Black dorsal markings on S8–S9 (distal abdomen) and black-outlined pterostigmas.



Image 14. *Macrodiplax cora* male, Khor Qurayyat, 29 March 2016. Typical pennant pose at top of stem. Dark legs, fluffy thorax (no stripes), dark pinkish face.



Image 15. *Macrodiplax cora* male, Khor Durf 29 November 2013. Dorsal black line (hourglass shapes) along abdomen. Amber on wings near thorax.



Image 16. *Macrodiplax cora*: ovipositing in tandem, Khor Durf, 4 October 2014.



Image 17. *Macrodiplax cora* female, Khor Durf, 2 June 2016. Black dorsally along abdomen, black legs, black stripes on thorax, black lines around pterostigma. White face.



Image 18. *Selysiothemis nigra*: Khor Qurayyat, 19 May 2016. Typical pennant pose. Dark face, thorax and dark appendages. Pale, lightly-veined, clear wings. Pale pterostigma with black equal signs.



Image 19. *Urothemis thomasi*: Wadi Tiwi, 28 November 2014. No black abdominal line dorsally, dark stripes on pale thorax.



Image 20. *Urothemis thomasi*: Wadi Tiwi, 28 November 2014. Bicoloured orange areas on hindwings base. Stripes on side of thorax.



Image 21. *Urothemis thomasi*: Wadi Rafsah, 31 March 2016. Pinkish face with pale or pinkish vertex and dark legs.



Image 22. *Zygonyx torridus*: Wadi Abyad, 3 December 2015. Pale markings along abdomen.



Image 23. *Zygonyx torridus*: Siwayh, 29 March 2016. Flight over faster moving water.

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