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OdonataMAP - Progress report on the Atlas of the Dragonflies and Damselflies of Africa - 2016/17 and 2017/18

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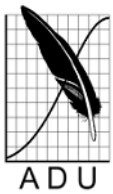

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OdonataMAP - Progress report on the Atlas of the Dragonflies and Damselflies of Africa - 2016/17 and 2017/18

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This paper reports progress with OdonataMAP, the Atlas of Dragonflies and Damselflies of Africa, for the two-year period 1 July 2016 to 30 June 2018. During the two-year review period, the database for the project grew by 30,423 records to 52,257, starting from 22,809 records collected between 2010 and June 2016. Submissions were made from 25 African countries. In six of the nine provinces of South Africa, the number of OdonataMAP records for the province more than doubled. The provinces in which the number of records were not doubled were Gauteng (44% of records made during reporting period), Free State and North West (both 46%). Five observers contributed more than 1000 records over the two-year period, and a further 10 between 500 and 999 records. The total number of observers for the two-year period was 529, compared with 295 in the 2010-16 period. One of the important success of OdonataMAP during the review period was to increase the number of observers, and to reduce the project's dependence on a small number of citizen scientists.

Keywords: Citizen Science, Odonata

What is OdonataMAP?

OdonataMAP is the Atlas of Dragonflies and Damselflies of Africa. It was launched in 2010; the first record was uploaded into the OdonataMAP database on 22 September 2010. At the time, the project objectives were (1) "to map the current distribution of the insect Order Odonata, i.e. dragonflies and damselflies, occurring in Africa" and (2) "to serve as a repository of all existing distribution data for this group."

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OdonataMAP provides up-to-date distributions of the dragonflies and damselflies, a critical component of addressing their own conservation priorities, and also the conservation of freshwater ecosystems. The project will provide a valuable input to a revision of the Red List status of each species.

Besides the distribution maps, OdonataMAP aims to make a contribution to understanding the seasonal phenology of these species. Documenting and quantifying changes in seasonality are a critical component of understanding the impacts of climate change on biodiversity (Hassel *et al.* 2007, Bush *et al.* 2013).

Thus OdonataMAP aims not only to mainstream the conservation of the Odonata, but also the freshwater habitat on which they (and we) depend. Besides its own value for the conservation of Odonata, this atlas has the potential to influence government policy on the use of water resources, especially for the rural poor. There is no other taxon which has the potential to be so politically prominent in this way.

The report by Underhill *et al.* (2016) summarized what OdonataMAP had achieved during the period 22 September 2010 until 30 June 2016. The database then contained 22,809 records. The end of June is a natural splitting point for the Odonata year, because it is midwinter in the southern hemisphere and fieldwork is at its lowest ebb. This report focuses on the growth of the database for the two "years", from 1 July 2016 to 30 June 2017, and from 1July 2017 to 30 June 2018.

The Odonata Database of Africa (ODA) is an open access database developed by a JRS-funded project (Clausnitzer *et al.* 2012, Dijkstra 2016). This database contains 121,121 records of the distribution of dragonflies and damselflies across Africa and it includes most of the museum specimen records for the region.This database became available online during the last months of 2016, where it is known as African Dragonflies and Damselflies Online (ADDO) (http://addo.adu.org.za/). ADDO is a collaboration between the Department of Conservation Ecology and Entomology (University of Stellenbosch) and the ADU (University of Cape Town). Although the two databases are separate, search queries made to the OdonataMAP database can include a search of the Odonata Database of Africa. This collaboration, completed during the two-year reporting period, represents a major consolidation of data resources.

How many records were submitted to OdonataMAP in the period July 2016 to June 2018, and where in Africa did they come from?

For the years July 2016 to June 2017 and from June 2017 to July 2018, OdonataMAP gained 11,091 and 18,357 records respectively, a total of 30,423 new records, bring the grand total since the start of the project in 2010 to 52,257 records (Table 1). This is an increase from 22,809 records in June 2016, thus 56.4% of the OdonataMAP database has been contributed in the two years under review (Table 1).

Table 1: Annual totals (1 July to 30 June of following calendar year) of submissions of dragonflies and dragonflies to OdonataMAP

Year (July to June)	Number of submissions	Cumulative totals	Cumulative percentage
2010/11	349	349	1
2011/12	951	1300	2
2012/13	4000	5300	10
2013/14	5074	10374	20
2014/15	3997	14371	28
2015/16	8438	22809	44
2016/17	11091	33900	65
2017/18	18357	52257	100

The records submitted during the two year reporting period came from 25 African countries; the total number of countries for which records have been submitted is now 32 (Table 2). Outside of South Africa, most of the records for the reporting period came from Namibia (491) and more than 100 records from 11 other African countries (Namibia, Botswana, Zambia, Nigeria, Malawi, Angola, Kenya, Mozambique, Zimbabwe, Swaziland, and Sudan). Two records were submitted from countries in the Middle East (Table 2).

Table 2: Numbers of submissions of dragonflies and damselflies to OdonataMAP from countries of Africa (and the Middle East) prior to and during the two-year reporting period

Country	2010-2016	2016/17	2017/18	Total
Angola	14	164	125	303
Benin	5			5
Botswana	213	137	262	612
Democratic Republic of Congo	4	63	44	111
Iraq			1	1
Israel			1	1
Egypt	3			3
Ethiopia	90			90
Gambia	4			4
Ghana	13	68		81
Kenya	82	220	55	357
Lesotho	5	8		13
Liberia	8	8		16
Madagascar	44			44
Malawi	441	144	201	786
Mauritius	1			1
Mozambique	157	19	192	368
Namibia	145	132	359	636
Nigeria	75	320	35	430
Republic of the Congo	7	12		19
Reunion			7	7
Rwanda	6	19		25
Senegal	7	14		21
Seychelles	6		2	8
Sierra Leone	35	76		111
Somalia	1			1
South Africa	20339	9475	17347	47161
Sudan	13		118	131
Swaziland	556	60	89	705
Tanzania	51	3	13	67
Togo	3			3
Uganda	73	29	52	154
Zambia	259	26	334	619
Zimbabwe	144	77	94	315
Total	22804	11074	19331	53209

In six of the nine provinces of South Africa, more than 50% of the total number of records had been submitted in the two-year reporting period (Table 3). The largest percentage increase was for the Western Cape, for which 6,635 records were submitted, 74% of the of the total number of OdonataMAP records for the province. The provinces in which the number of records

were not doubled were Gauteng (44% of records during reporting period), Free State and North West (both 46%) (Table 3). Overall, for South Africa as a whole, 57% of records were submitted during the reporting period (Table 3).

Table 3: Numbers of submissions of dragonflies and damselflies to OdonataMAP from the nine provinces of South Africa prior to and during the two-year reporting period. The percentage of records for each province during the reporting period is provided in the final column

	Number of records				
Province	2010-2016	2016/17	2017/18	Total	Percentage of records 2016-2018
Eastern Cape	1454	591	1730	3775	62
Free State	607	280	241	1128	46
Gauteng	1257	529	460	2246	44
KwaZulu-Natal	7597	3162	4755	15514	51
Limpopo	2845	988	2378	6211	54
Mpumalanga	2777	744	2601	6122	55
North West	788	266	413	1467	46
Northern Cape	566	429	412	1407	60
Western Cape	2275	2433	4202	8910	74
Total	20166	9422	17192	46780	57

What were the outcomes of the Shoot the Dragons Weeks of the past two summers?

OdonataMAP hosted a series of 10 "Shoot the Dragons Weeks" in the summers of the reporting period, three in 2016/17 and seven in 2017/18 (Table 4). They ran from the Saturday of one week to the Sunday of the following week, so that they included two weekends. Their purpose was to promote participation in OdonataMAP, and to maintain momentum in data collection and submission. There is a full description of the results of the very first week (Underhill *et al.* 2016a). The total number of records submitted during the Shoot the Dragons Weeks was 9,270, so that 30% of the records during the reporting period were submitted during the 10 Shoot the Dragons Weeks. To put this into context, the 90 days of the 10 Weeks represents about 20% of the period of the year when the Odonata are most active. This provides a coarse measure of their effectiveness. Shoot the Dragons Weeks will be repeated in the 2018/19 summer.

Table 4: Shoot the Dragons Weeks for the summers of 2016/17 and 2017/18

			Number of			
Week	Start date	End date	Records	Observers	Countries	Taxa
		Summer 2016/17				
1	26 November 2016	4 December 2016	1200	61	8	116
2	21 January 2017	29 January 2017	1384	58	10	120
3	1 April 2017	9 April 2017	634	50	5	83
		Summer 2017/18				
1	7 October 2017	15 October 2017	590	48	12	91
2	28 October 2017	5 November 2017	884	54	6	95
3	25 November 2017	3 December 2017	701	53	10	90
4	13 January 2018	21 January 2018	1234	66	9	117
5	10 February 2018	18 February 2018	1073	53	8	112
6	10 March 2018	18 March 2018	745	42	6	92
7	7 April 2018	15 April 2018	825	60	5	92

How is the number of OdonataMAP observers growing?

Five observers contributed more than 1000 records over the two-year period, and a further 10 between 500 and 999 records (Table 5). The most prolific observer contributed 6% to the total number of records; by contrast, in the 2010-16 report (Underhill *et al.* 2016b), the top two observers contributed 19% and 15% of the total number of records. The total number of observers for the two-year period was 529, compared with 295 in the 2010-16 period (Underhill *et al.* 2016b). One of the important success of OdonataMAP during the review period was to increase the number of observers, and to reduce the project's dependence on a small number of citizen scientists.

Table 5: OdonataMAP observers who submitted more than 150 records for the reporting period (1 July 2016 to 30 June 2018)

Observer	Records
Ryan M Tippett	2082
Jean Hirons	1683
Christopher Peter Small	1663
Corrie du Toit	1505
Richard Alan Johnstone	1233
Andries Petrus de Vries & Joey de Vries	895
Desire Darling & Gregg Darling	829
Alan Manson	797
Maritza Van Rensburg	742
Andre Marais	623
Sharon Stanton & Heleen Louw	609
Altha Liebenberg	606
Christopher Willis	575
Alf Taylor & Hilary Harrison	568
Alicia Culverwell	547
Niall Perrins	495
John H Wilkinson	493
Rob Dickinson	468
Bensch Gert & Juan-Pierre Antunes	458
Ilse Hulme	429
Dawie Kleynhans & Sarieta Kleynhans	415
Diana Russell	365
Juan-Pierre Antunes & Gert Bensch	313
Christopher JH Hines	290
Gary Brown	288
Phillip Nieuwoudt	264
Jacobus (Lappies) Labuschagne	262
Pieter La Grange	260
Wilna Steenkamp	255
Bensch Gert	247
Bernardine Alice Altenroxel	227
David Kennedy	209
Juan-Pierre Antunes	207
Zenobia van Dyk	205
Riëtte Griesel	197
Norman Barrett	193
Sharon Basel	192
Katharina Reddig	188
Herb Kageler	181
Sharon Stanton	176
Laban Njoroge	171
Waterberg Team 2017 (Andries Petrus de Vries & Joey de Vries)	167
Pieter Cronje	165

Growing numbers of records generated increased workloads for the expert panel. This is a group of volunteers who either undertake identifications from scratch or confirm the identifications made by the observers. Over the reporting period, the load has been shared mainly

between John Wilkinson, Ryan Tippett, Sharon Stanton, Alan Manson, Bertie Brink and Lappies Labushagne. Warwick Tarboton remains the anchor to whom difficult records get referred, and the expert panel has also consulted K-D Dijkstra from time to time.

What are a few of the most remarkable records submitted to OdonataMAP during the past two years?

On 29 April 2018, what is likely to prove to be a new species of dragonfly, from Angola, was added to OdonataMAP by Christopher Hines (Figure 1). It generated a lot of excitement (see for example https://www.facebook.com/animal.demography.unit/photos/a.264976170247321.61084.263839507027654/1675195419225382/?type=3&theater)

Figure 1: OdonataMAP record 50330 submitted to OdonataMAP by Christopher Hines from Angola. This is, in all likelihood, a new species. (http://vmus.adu.org.za/?vm=OdonataMAP-50330)

Commenting on the original posting of the photo in the Facebook group called Dragonflies and Damselflies of Southern Africa, Jens Kipping, authority on the Odonata of Angola, wrote: "Holy moly, Christopher Hines! First, I thought that somebody from the South American or Asian group sent a picture accidentally. I cannot believe that this is from Angola. I do not have any clue what this libellulid is! It looks a bit like *Rhyothemis* but also, from the body, a bit like a *Palpopleura*. This might even be a new genus." KD Dijkstra, taxonomic authority on African Odonata, subsequently analysed the images, and considered it likely that this might prove to

be a new species in the genus *Trithemis*.

An unexpected and dramatic range expansion occurred during the reporting period. The Ceres Streamjack (also known as Spesbona) *Spesbona angusta* was described in 1863, but was thought for several decades to be extinct, having not been recorded since 1920. The streams in the area near Ceres, Western Cape, where it had been observed in 1920, had been radically transformed and many no longer flowed due to over-extraction of water for the fruit industry. It was rediscovered in November 2003, when a population was found along the Dutoitsrivier, which flows into the Theewaterskloof Dam, near Villiersdorp, Western Cape, South Africa. This locality is 60 km distant from the original Ceres locality. There are multiple sightings in this immediate Theewaterskloof Dam area (OdonataMAP database), and the IUCN-defined Area of Occupancy is 24 km2 (Samways 2018). For more than a decade, this was thought that this was the only locality where the species occurred. Then, on 10 October 2017, citizen scientist Jean Hirons caused a massive surprise when she photographed the species at a locality near Sedgefield, 330 km due east of the Theewaterskloof site (Figure 2). This raises the obvious question: does it occur at a series of intermediate localities, in suitable habitats along the mountain ranges that link these two isolated sites? The likely answer is yes, because an inspection of Figure 3 of Underhill *et al.* (2018) reveals that, while fieldwork in the areas of the two known localities of the Ceres Streamjack have been reasonably intensive, the intervening area has been poorly covered by fieldwork, and is regarded as a priority area for future expeditions.

Figure 2: This record, by Jean Hirons, of a Ceres Streamjack (Spesbona) *Spesbona angusta* in Sedgefield, Western Cape, was 330 km east of the only known locality for the species. (http://vmus.adu.org.za/?vm=OdonataMAP-35883)

What are the take-home messages?

In a nutshell, the OdonataMAP project grew rapidly in the two-year period under review. From a public-interest perspective, there can be no doubt that the Odonata have been transformed from being the taxon of focus for a minuscule group of enthusiasts, to becoming quite substantial. It is likely that the size of the dragonfly/damselfly community is in the process of overtaking that of the butterfly community, if it has not done so already. It is still far smaller than the bird community, but that is challenge that OdonataMAP is taking on.

Multiple factors have played a role in this growth. Emerging at roughly the same time, they have interacted with each other, and reinforced each other: (1) the publication of the superb fieldguide (Tarboton & Tarboton 2015); (2) the excellently managed Dragonflies and Damselflies of Southern Africa group on Facebook; and (3) the sturdy Virtual Museum platform for uploading images into a long-term database; (4) the award of funding to the Animal Demography Unit at UCT by the JRS Biodiversity Foundation, Seattle, USA.

Growing the broad civil society interest in the Odonata is part of the strategy for meeting the next challenge. This is in fact the challenge set by the JRS Biodiversity Foundation: "How do we get the data into use? How do we mainstream the dragonflies and damselflies so that the OdonataMAP data become serious components of conservation policy making, of environmental impact of assessments, and the thinking of politicians and civil servants?" Our report on the Odonata of the Kruger National Park was an experimental step in that direction (Underhill *et al.* 2018).

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