

Mission and main accomplishments **Klaas-Douwe ‘KD’ B. Dijkstra**

Expanding species expertise opens new frontiers in the study and love of nature. I strived to make Odonata the first insect order to attain universal popularity and application in science, conservation, and public interest. Dragonflies’ beauty gives threatened freshwaters a face, their sensitivity a gauge. I built their full potential in Africa from the bottom up: exploration in the field, description in collections, application in conservation, and finally innovation in science. With 80% of global population growth and a fickle climate becoming more extreme, the tropics’ most changeable continent awaits the greatest transformation. But with 1% of global research output, the potential for development is also nowhere greater. Now nature, natural history and their archives are all under pressure, we must discover and document what we still can, and support those who will.

To put focus on this mission, most new Odonata were named at once in a century, adding 1 to every 12 species in Africa, of which *Umma gumba* was one of 2016’s Top 10 New Species. Subsequently represented biodiversity research in David Attenborough’s 90th birthday celebrations on BBC One and reflected on his legacy in Nature.

Dijkstra, K.-D.B., 2016. Restore our sense of species. *Nature* 533: 172-174.

Dijkstra, K.-D.B., N. Mézière & J. Kipping, 2015. Sixty new dragonfly and damselfly species from Africa (Odonata). *Odonatologica* 44: 447-678.

The 1st species-level treatise of Odonata for a tropical continent covered 65% of African species. Private donors were recently led around Madagascar to support a book on its forgotten Odonata.

Dijkstra, K.-D.B. & V. Clausnitzer, 2014. *The Dragonflies and Damselflies of Eastern Africa: handbook for all Odonata from Sudan to Zimbabwe*. Royal Museum for Central Africa 1-260.

The most successful publication on the order to date with 35,000 copies (10 a day for 10 years) in 5 languages.

Dijkstra, K.-D.B. & R. Lewington, 2006. *Field Guide to the Dragonflies of Britain and Europe*. British Wildlife Publ. 1-320.

Most complete molecular phylogeny of Odonata to date and 1st consensus classification of order with 19 authors.

Dijkstra, K.-D.B., et al., 2014. Redefining the damselfly families: a comprehensive molecular phylogeny of Zygoptera (Odonata). *Systematic Entomology* 39: 68-96.

Dijkstra, K.-D.B., et al., 2013. The classification and diversity of dragonflies and damselflies (Odonata). In: Zhang, Z.-Q. (Editor). *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness*. *Zootaxa* 3703: 36-45.

Restored ties with Naturalis Biodiversity Center as curator of University of Suriname. Dutch Foreign Ministry funded repatriation of expertise on the nation’s greatest asset — biodiversity— as collection databases and popular books.

Postdoc in Stellenbosch, Leiden and Cambridge. Lecturing from The Netherlands to Angola and Taiwan; for Tropical Biology Association in Tanzania, Madagascar and Uganda.

Consultant for A Rocha, Arcelor Mittal, Birdlife/RSPB, Congo Biodiversity Initiative, Conservation International, IUCN, Frankfurt Zoological Society and US government.

Long-time member of the IUCN Odonata Specialist Group aiding 1st global estimate of extinction risks in insects and 1st complete Red List for a tropical continent.

Clausnitzer, V., K.-D.B. Dijkstra, et al., 2012. Focus on African freshwaters: hotspots of dragonfly diversity and conservation concern. *Frontiers in Ecology and the Environment* 10: 129-134.

Clausnitzer, V., V.J. Kalkman, M. Ram, B. Collen, J.E.M. Baillie, M. Bedjanič, W.R.T. Darwall, K.-D.B. Dijkstra, et al., 2009. Odonata enter the biodiversity crisis debate: the first global assessment of an insect group. *Biological Conservation* 142: 1864-1869.

Odonata made applicable for environmental assessment across Africa with 1st African Freshwater Entomology Workshop (AFRESH) and African Dragonflies and Damselflies Online (ADDO) with free access to indicator value, ecology, range and identification of all 770 species. Data extent (>125,000 records on GBIF) and detail may be unsurpassed by any insect and most animal groups.

Dijkstra, K.-D.B., et al., 2011. Dragonflies and Damselflies of Africa (Odonata): history, diversity, distribution, and conservation. In: Darwall, W.R.T., et al (Editors). *The Diversity of life in African Freshwaters: Under Water, Under Threat*. IUCN. 128-177.

Application of African Odonata rests on 57 taxonomic and faunistic publications (78 new species named) and >900 field days in 22 African countries: collection assembled contains 90% of African species, DNA-barcodes of 76%.

Dijkstra, K.-D.B., 2007. *Demise and rise: the biogeography and taxonomy of the Odonata of tropical Africa*. PhD Thesis, Leiden University. 143-187.

The 1st synthesis on aquatic insect diversity’s origins explored the potential of Odonata (and our unparalleled data) for evolutionary and global change research. Other groups poorly represent the most dense and responsive biodiversity: tied to water, but able to fly.

Dijkstra, K.-D.B., M.T. Monaghan & S.U. Pauls, 2014. Freshwater Biodiversity and Aquatic Insect Diversification. *Annual Review of Entomology* 59: 143-163.

Damm, S., K.-D.B. Dijkstra & H. Hadrys, 2010. Red drifters and dark residents: the phylogeny and ecology of a Plio-Pleistocene dragonfly radiation reflects Africa’s changing environment (Odonata, Libellulidae, *Trithemis*). *Molecular Phylogenetics & Evolution* 54: 870-882.

Co-founder of the Dutch dragonfly society (NVL) and content editor of the ISI-listed journals *Odonatologica* and *International Journal of Odonatology*.

Personal record **Klaas-Douwe ‘KD’ B. Dijkstra** (7 January 1975, Kampen, The Netherlands)

Visiting researcher	Conservation Ecology and Entomology, Stellenbosch University, South Africa		
Honorary associate	Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA, Leiden, The Netherlands		
E-mail	kddijkstra@gmail.com	Personal site	science.naturalis.nl/dijkstra/
Twitter	@bionomer	Photo site	www.flickr.com/photos/kiskadee/
African Dragonflies & Damselflies Online	http://addo.adu.org.za/ [test version]		
African Dragonflies on Facebook	https://www.facebook.com/african.dragonflies/		
African handbook on Freshwater Blog	https://freshwaterblog.net/2015/06/01/discovering-the-dragonflies-and-damselflies-of-eastern-africa/		
Congo dragonfly hunt on YouTube	www.youtube.com/watch?v=Arr2k7dwzSU		
Sixty new species in Forbes	http://www.forbes.com/sites/grrlscientist/2016/01/28/sixty-new-species-of-dragonflies-discovered-in-africa/#1b4241c54963		
Umma gumma in Top Ten New Species	http://www.esf.edu/top10/		
New dragonflies on The Conversation	https://theconversation.com/what-dragonflies-say-about-our-ignorance-of-the-natural-world-60215		
Comment on species sense in Nature	http://www.nature.com/news/natural-history-restore-our-sense-of-species-1.19870		
Sir David’s dragonfly on BBC One	https://www.youtube.com/watch?v=FMDnPUXTcdc&feature=youtu.be		

Education and personal development

1980-1988	Childhood in Egypt, passion for natural history began at age of nine; attended British International School Cairo.
1988-1999	Active and broadly-oriented member of Dutch youth organisation for natural history (NJN).
1992-1998	MSc in evolutionary biology, biogeography and systematics (March 1998; cum laude). Leiden University, The Netherlands.
2001-2006	PhD on systematics and biogeography of Afrotropical Odonata (May 2007). Leiden University, The Netherlands.
MSc courses	All subjects of general biology, including zoology, general and tropical botany, geology, palaeontology, systematics, biogeography, phylogenetic systematics, evolutionary biology, animal and plant ecology, ethology, mathematics, statistics and environmental biology.
MSc research and special courses:	
1994-1995	Identification key for European Drosophilidae (Diptera). Dr. J. van Alphen, Animal Ecology.
1995	Botany and vegetation. Algarve, Portugal. Prof. D. Mabberley, Oxford University.
1995	Tropical ecology. Naivasha, Kenya. Tropical Biology Association.
1995-1996	Competition for resources in fruit-feeding butterflies (Lepidoptera: Nymphalidae) in Kibale Forest, Uganda. Prof. P. Brakefield, Evolutionary Biology.
1997	Phylogenetic systematics. Research school Biodiversity, Leiden University.
1997-1998	Phylogeny and biogeography of Philippine and Greater Sunda <i>Coeliccia</i> species (Odonata: Platycnemididae). D. Gassmann, Prof. E. Gittenberger & J. van Tol, Animal Systematics.
2009	Advanced phylogenetic analysis. Research school Biodiversity, Leiden University.

Languages	Dutch	mother tongue
	English	very fluent due to eight years of British education
	French	reasonably colloquial (e.g. for fieldwork in Africa); moderate writing ability
	German	good reading ability; moderate speaking and writing ability

Scientific activities

- 2012-2016 Researcher at Stellenbosch University (with M.J. Samways) on *A practical tool for evaluating freshwater health and biodiversity Africa-wide*, funded by JRS Biodiversity Foundation.
- 2016 Invited author of comment *Restore our sense of species* on Sir David Attenborough's natural history legacy for journal *Nature*.
- 2014-2015 Researcher at Naturalis Biodiversity Center (with J. van Tol) describing 60 new African Odonata species and main contributor to 10,000 samples of over 2000 species analysed for *All Odonata Barcode Initiative*, funded by Economic Structure Enhancing Fund (FES).
- 2012-2013 Invited lead author (with M.T. Monaghan and S.U. Pauls) on *Freshwater Biodiversity and Aquatic Insect Diversification* for Annual Review of Entomology.
- 2012-2013 Invited lead author (with eighteen co-authors) on Odonata for *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness* in *Zootaxa*.
- 2012 Researcher at University Museum of Zoology in Cambridge (with P. Brakefield) on aquatic insect diversification review and phylogeny of damselflies, funded by Naturalis.
- 2010 Participant of two-month Congo River expedition of Royal Museum for Central Africa, Royal Belgian Institute for Natural Sciences and University of Kisangani, marking foundation of national centre for biodiversity in Democratic Republic of Congo.
- 2001-2007 Researcher (with V. Clausnitzer) in BIOTA project *Biogeography, Diversity and Ecology of East African Odonata* funded by German Government. Collections studied in Berlin, Brussels, Bulawayo, London, Madrid, Nairobi, Paris, Stockholm and Tervuren; support from IHP/ARI grants (EU's Improving Human Potential by Access to Research Infrastructures): ABC (Belgium): 2003, BIOD-IBERIA (Spain): 2004, COLPARSYST (France): 2003, HIGH LAT (Sweden): 2004, SYS-RESOURCE (United Kingdom): 2001, SYNTHESYS grants, funded by Integrated Infrastructure Initiative of EU's Sixth Framework Programme: BE-TAF (Belgium): 2005.
- since 1998 Honorary research associate at Naturalis; member (with J. van Tol, F. Stokvis, V.J. Kalkman, M. Hämäläinen and R.A. Dow) and main coordinator of Damselfly Workers at Naturalis (DAWN) studying molecular phylogeny and biogeography of Zygoptera.

Collections, consultancy and conservation

- since 2003 Member of IUCN Odonata Specialist Group; evaluator of countless Red List assessments.
- since 1995 Set up collection of African Odonata that now includes >690 of 770 species known (90%).
- 2013 Invited speaker at A Rocha symposium for declaration of Atewa National Park, Ghana.
- 2009-2012 Consultant to USA's Millennium Challenge Corporation (2009), Arcelor Mittal (2010-2012) and Severstal (2011) to assess environmental impacts in Liberia and Tanzania.
- 2008-2009 Curator at Naturalis Biodiversity Center, co-funded by Conservation International, to support IUCN Global Dragonfly Assessment.
- 2008-2009 Digitized over 600 primary types of Odonata at Naturalis.
- 2008-2009 Databased all Odonata records in Royal Museum for Central Africa, Belgium.
- 2007-2008 Curator of invertebrates at National Zoological Collection of Suriname (NZCS), University of Suriname, coordinating two assistant curators.
- 2007-2011 Initiator and advisor of collaboration Naturalis and NZCS; co-applicant to Dutch Foreign Ministry for collection digitisation and books on butterflies, fish and amphibians.
- 2006 Catalogued 118 primary types of Odonata in Natural History Museum, Zimbabwe.
- 2005-2010 Coordinator, assessor, evaluator and leading report author on Odonata for IUCN Freshwater Biodiversity Assessment of Africa.
- 2004-2006 Participant of Conservation International's RAP biodiversity assessments in Democratic Republic of Congo (2004), Liberia (2005) and Ghana (2006).
- 2003-2004 Revised and restructured Odonata collections of National Museums of Kenya, Nairobi.
- 1999 Participant of macrofauna assessment of Pripyat (Belarus) with Belarus National Academy of Sciences and Dutch Institute for Inland Water Management (RIZA).

Author- and editorships

- since 2007 Editor of taxonomy for ISI-listed *Odonatologica* and *International Journal of Odonatology*.
- 2016 Lead author of book on Madagascar's forgotten dragonflies; produced and distributed freely by Fondation Vahatra. Leader of private donor tour to amass photos and support.
- 2014 Scientific editor of *A Guide to the Dragonflies and Damselflies of South Africa* by W. and M. Tarboton (2015).
- 2004-2014 Lead author, editor and coordinator (about 20 co-authors) of field guide to European Odonata for British Wildlife Publishing: 35,000 copies in English (2006), French (2007), Dutch (2008), German and Spanish (2014).
- 2009-2010 Member of editorial board of *Tijdschrift voor Entomologie*.
- 2006 Scientific editor of *Dragonflies and Damselflies of South Africa* by M.J. Samways (2008).
- 1998-2002 Co-editor (and author) of handbook of Dutch Odonata; joint effort of Dutch society for odonatology (NVL), youth organisation for natural history research (NJN) and European Invertebrate Survey (EIS-Nederland).
- 1997-2001 Founding member of Dutch society for odonatology (NVL) and founder and editor-in-chief of journal *Brachytron*.

Conferences, lectures, teaching and training

- since 2016 Plenary speaker at Trends in Biodiversity and Evolution (TiBE) conference (2016, Portugal) and 7th International Barcode of Life (iBOL) conference (2017, South Africa).
- since 2012 Supervisor of PhD student and two research assistants at Stellenbosch University.
- 2016 Compiler of ADDO (African Dragonflies and Damselflies Online) providing free access to biotic value, ecology, distribution and identification of all 770 species; >125,000 records from ODA (Odonata Database of Africa) released to GBIF through BioFresh portal.
- 2016 Invited lecturer for Tropical Biology Association (TBA) in Kibale, Uganda.
- 2016 Convener of first AFRESH (African Freshwater Entomology Workshop): 69 delegates from 21 African countries working with dragon-, damsel-, may- and caddisflies convened for first time.
- 2015 Invited speaker at German entomological symposium in Frankfurt; Dutch symposium on DNA barcoding, Utrecht; South African entomological symposium in Grahamstown; international odonatological symposium in La Plata, Argentina.
- 2014 Invited lecturer for TBA in Kirindy, Madagascar.
- 2012-2013 Invited researcher and lecturer at Universidade Kimpa Vita, Uíge (Angola).
- 2009-2012 Invited lecturer for BSc and MSc courses on biodiversity at Leiden University.
- 2006-2012 Supervisor of MSc research at Naturalis Biodiversity Center. Examples: F. Stokvis: molecular phylogeny Platycnemididae, 2006-2007; B. van den Heuvel: molecular phylogeny Chlorocyphidae, 2009-2010; M.X. Urrutia: Odonata as bio-indicators in tropics, 2009.
- 2011 Invited lecturer for TBA at Amani, Tanzania.
- 2010 Invited lecturer at Center for Tropical Ecology and Biodiversity of Tung Hai University, Taiwan.
- 2009 Member of opposition at PhD defence J. van Tol, then associate director of Naturalis.
- 2005-2006 Invited speaker at odonatological symposia: international in Hong Kong, China; international in Pontevedra, Spain; European in Freising, Germany.
- 2001-2004 Organiser (and proceedings editor) of meetings on African Odonata in Gällivare and Bonn.
- 2003 Organiser of Odonata course for IUCN Freshwater Biodiversity Assessment; with National Museums of Kenya, Nairobi.
- 2002 Co-organiser of Worldwide Dragonfly Association's 3rd European meeting, Leiden.

Public appearances (selection)

- 2016 Video of me presenting Sir David with new dragonfly *Acisoma attenboroughi* was surprise climax of hour-long “Attenborough at 90” TV interview on BBC One.
- 2015 60 new species featured on >45 (mostly online) media outlets and blogs, including *Forbes*, *Scientific American*, *Science*, *Newsweek*, *The Conversation*, *De Volkskrant* (major Dutch newspaper) and *ZDF tivi* (German kids’ TV news).
- 2014 Speaker at theatre stakeholders’ event for Rotterdamse Schouwburg.
- 2012 Guest on one-hour talk show *Casa Luna* on Dutch national radio.
- 2011 Speaker *Wish You Were Here* for Toneelgroep Amsterdam, foremost Dutch theatre company.
- 2011 Inspirational speaker at conference *People Ideas Nature Creativity* (www.pinc.nl).
- 2010 Interviews about Congo 2010 expedition on Belgian TV news, *Villa VPRO* on Dutch national radio, *De Volkskrant*, and French magazine *Terre Sauvage*.

Field experience

African trips listed below, also fieldwork in Western Palaeartic (incl. Belarus, Turkey), Americas (USA, Mexico, Suriname), tropical Asia (Brunei, China, Sri Lanka, Taiwan, Thailand) and Australia. Support and funding from listed organisations, as well as BIOTA project of German Ministry of Science: 2003 (2x), 2004 (2x); International Dragonfly Fund: 2001 (2x), 2003; Uyttenboogaart-Eliassen Stichting of Dutch Entomological Society NEV: 1997, 1999 (2x), 2001 (2x), 2003, 2006 (2x), 2009 (2x); Worldwide Dragonfly Association: 2001.

- 2016 **Uganda** (24 Jun - 27 Jul) with Tropical Biology Association: training in Kibale NP.
- 2016 **Rwanda** (16 Mar - 29 Mar): general surveys.
- 2016 **Malawi** (7 Mar - 13 Mar) with Anchor Environmental, for Shire River Basin Management Programme: survey for management plan of Elephant Marshes.
- 2016 **Madagascar** (7 Jan - 20 Jan) for Odonatours: leader of company’s inaugural tour to gather photos and funds for introductory book to island’s forgotten dragonflies.
- 2014 **Madagascar** (01 Nov - 15 Dec) with Tropical Biology Association: training in Kirindy Forest Reserve.
- 2014 **South Africa** (06 - 13 Jan, 27 Feb - 03 Mar, 27 Mar - 07 Apr): general surveys.
- 2013 **Zimbabwe** (26 Nov - 10 Dec): successful search for two ‘lost’ endemics.
- 2013 **Angola** (21 Sep - 07 Oct) with Universidade Kimpa Vita: exploration of new campus at Uíge.
- 2012 **Angola** (12 Nov - 03 Dec) with Universidade Kimpa Vita: exploration of new campus at Uíge.
- 2012 **Liberia** (19 Feb - 11 Mar) for Arcelor Mittal: further survey of Nimba iron ore concession.
- 2011 **DR Congo** (03 - 29 Nov) with Frankfurt Zoological Society: survey of Upemba and Kundelungu NPs.
- 2011 **Tanzania** (25 Jul - 26 Aug) with Tropical Biology Association: training at Amani Nature Reserve.
- 2011 **Liberia** (16 - 23 Mar) for Arcelor Mittal: further survey of Nimba iron ore concession.
- 2011 **Sierra Leone** (23 Feb - 16 Mar) for Birdlife/RSPB: survey of Gola NP and community forests.
- 2011 **Liberia** (17 Jan - 23 Feb) for Severstal: survey of Putu iron ore concession.
- 2010 **Liberia** (25 Sep - 15 Oct; 24 Dec - 14 Jan 2011) for Arcelor Mittal: survey Nimba iron ore concession.
- 2010 **DR Congo** (27 Apr - 15 Jun) with Congo Biodiversity Initiative: training expedition on Congo River.
- 2009 **Gabon** (27 Dec - 16 Jan 2010): survey of Haut Ogooué Province.
- 2009 **Tanzania** (01 - 29 Aug) with Malagarasi Aquatic Rapid Biodiversity Assessment, for Millennium Challenge Corporation (USA): survey of site for proposed Igamba dam.
- 2009 **Egypt** (02 - 17 May): survey of Siwa Oasis for Afrotropical pluvial relicts.
- 2008 **Cameroon** (22 May - 20 Jun): general surveys.
- 2007 **Namibia** (13 - 30 Apr): general surveys.
- 2006 **Ghana** (12 Jun - 12 Jul) for Conservation International/Alcoa: survey Atewa bauxite concession.
- 2006 **South Africa and Zimbabwe** (15 Jan - 25 Feb): general surveys and museum visits.
- 2005 **Liberia** (16 Nov - 14 Dec) for Conservation International/EU: survey for national forest conservation plan.
- 2004 **DR Congo** (25 Oct - 11 Nov) for Conservation International/USAID: survey Lokutu oil palm concession.
- 2004 **Ethiopia** (11 Mar - 09 Apr) for BIOTA East Africa: survey of threatened endemics.
- 2003 **Kenya and Tanzania** (08 Sep - 01 Oct) for BIOTA East Africa: general surveys and museum visits.

- 2003 **Uganda** (22 Apr - 15 Jun) for BIOTA East Africa: survey of Semliki and Bwindi Impenetrable NPs.
 2001 **Malawi and Mozambique** (04 Nov - 20 Jan 2002) for BIOTA East Africa; with Mulanje Mountain Conservation Trust: study of monotypic genus *Oreocnemis*, threatened by bauxite mining.
 2000 **Ghana** (04 Apr - 11 May): general surveys.
 1995 **Uganda** (30 Aug - 02 Mar 1996): survey of Kibale NP (during MSc work on butterflies).



Dragonflies studied by me at all dark localities; other dragonfly data are available from white localities.

Grants and (estimates of) commercial work

Combined value of travel grants estimated at € 50,000 or \$ 55,000: thus **raised over € 810,000 or \$ 910,000**. Based on project costs and personal investments, **African Odonata data's value in October 2014 estimated at € 465,000 or \$ 523,000** (distribution record and ecology databases, completed molecular analyses, field sampling, collection maintenance etc.). All as principal investigator unless stated otherwise.

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| 2016 | £ 2,600 | Odonatours (Sweden)
Contributions for book on Madagascar Odonata from fifteen tour participants. |
| 2014 | \$ 9900 | Mohamed bin Zayed Fund (UAE)
Survey and training endemic Odonata of Guinea (postponed due to Ebola outbreak) |
| 2014 | € 30,000 | Naturalis Biodiversity Center (Netherlands)
Research visit Naturalis Biodiversity Center, Leiden |
| 2012 | \$ 295,900 | JRS Biodiversity Foundation (USA): PI with Prof. M.J. Samways, Stellenbosch University
A practical tool for evaluating freshwater health and biodiversity Africa-wide |
| 2012 | € 19,500 | BioFresh Contingency Fund (EU)
Completion and GBIF disclosure Odonata Database of Africa |
| 2012 | € 22,160 | Naturalis Biodiversity Center (Netherlands)
Research visit University Museum of Zoology, Cambridge |
| s. 2009 | \$ 70,000 | total estimate consultancies in Tanzania an Liberia (see field experience) |
| 2007 | € 285,000 | Twinning Programme (Dutch Foreign Ministry): initiator, co-author and project advisor
Collaboration Naturalis and National Zoological Collection of Suriname |

2007	\$ 40,000	Conservation International (USA) Supporting Global Dragonfly Assessment
s. 2004	£ 25,000	total estimate British Wildlife Publishing fees and royalties for European field guide

Dedications and awards

2016	<i>Umma gumma</i> of 60 new species selected from about 18,000 species described each year as one of Top Ten New Species for 2016 (www.esf.edu).
2015	Honoured with dedication by W. and M. Tarboton in their dragonfly field guide for South Africa.
2005	Worldwide Dragonfly Association's outstanding achievement award (shared recipient).