

Searching for Rwanda's Flying Jewels

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Introduction

Over 780 different dragonfly species are known from the African mainland. The majority of all African continental dragonflies (74%) are classified by the IUCN Red List of Threatened species as Least Concern (LC), while about 9% (65 species) have been assessed as “threatened” – ie., Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) – and almost 4% (25 species) as Near Threatened (NT). These figures are from Clausnitzer et al. (2012) and all data is available at [www.iucnredlist.org]. At the moment all African species are being re-assessed against the IUCN red list criteria.

Rwanda

Rwanda is situated on the Albertine Rift (the western branch of the East African Rift), which is one of the diversity hotspots for African dragonflies (Clausnitzer et al. 2012). The historical information on Rwanda's dragonfly diversity is rather limited and most available records date back to the beginning of the 20th century. A total of 53 dragonfly species was known for Rwanda at the end of 2015. This is low, considering the country's richness in aquatic habitats and in comparison with the 228 species known from Uganda.

Within a project about the Lake Victoria Catchment, funded by Mac Arthur and facilitated by the IUCN Freshwater Unit, we managed to allocate some funding for field work in Rwanda. In January and March 2016 we spent a total of three weeks surveying dragonflies in Akagera NP (March 2016), Nyungwe NP (January and March 2016) and Musanze (January 2016). Erasme Uyizeye and Yvette Umurungi joined us for some of this survey work. Dragonflies were observed in the field, caught with sweep nets and identified with Dijkstra & Clausnitzer (2014).

Results

Within our rather short surveys we managed to expand the checklist of dragonflies for Uganda by 36 species to a total of 90. During the three weeks spent in the field we recorded a total of 79 species. Amongst the 37 new country records, one species is new to science (Fig. 1) and another species is possibly also new. The highest species number was recorded from the Akagera National Park area, while endemic, range-restricted and the majority of threatened species were recorded from the Nyungwe National Park. Nevertheless this is certainly not the end of Rwanda's dragonfly species and we expect at least 50 more species await discovery as new country records. Results worth mentioning are listed briefly below. A List of Rwanda's dragonflies (Odonata) with regional occurrence is provided in Table 1.

Species-specific results

The papyrus wisp (*Agriocnemis palaeforma*) was previously only known from a few papyrus swamp areas in Uganda. Because of its scarce and scattered records it was recently globally and for Uganda nationally listed as Endangered on the Red List. After searching without success in the vast papyrus swamps in the Akagera National Park, we managed to find it in a papyrus swamp along the Akagera River. It seems that the papyrus wisp needs a certain amount of water flow in the papyrus swamp. Even though this species will be downlisted on the global Red List, it will remain in a threat category, since the records are still scarce and scattered and papyrus swamps in general have been facing serious losses in extent and quality due to building activities, agriculture, frequent burning and water pollution in Uganda.

A new sprite (*Pseudagrion*) species (Fig. 1) was found along a stream at Karamba. It is similar to the montane giant sprite (*Pseudagrion bicoeruleans*) found on mountains well above 2000 m a.s.l. in northern



Figure 1. The new sprite (*Pseudagrion*) species found along a forest stream in the Karamba area of the Nyungwe National Park, January 2016. Photo credi: Jens Kipping.



Figures 2. Kamiranzovu Swamp in the Nyungwe National Park, March 2016. Photo credit: Viola Clausnitzer.

Tanzania, Kenya and eastern Uganda. It might be a highly endemic species similar to the Nyungwe junglewatcher and more information on population size, distribution and ecology is urgently required.

The sighting of a potential duskhawker from the genus *Heliaeschna* in the southern palm swamp forests of Akagera National Park would add an interesting genus to Rwanda's dragonfly fauna. This elusive genus is, like the similar genus *Gynacantha*, difficult to record. It flies in the shadow of swamp forests and is active at dusk.

The gorilla longleg (*Notogomphus gorilla*) was only recently described based on specimens collected from the Bwindi Impenetrable National Park and Bundibugyo in Uganda and from Mt Hoyo, Ituri in DRC (Dijkstra et al. 2015). Its range and habitat was described as "forest streams between about 700 and 1600 m a.s.l. in western Uganda and adjacent Congo-Kinshasa" (Dijkstra et al. 2015, p 573). In the Nyungwe National Park the gorilla longleg was found in good numbers along the Gisakura River.

The yellow-fronted longleg (*Notogomphus flavifrons*) is a high altitude species, previously only known from historical records from Bwindi Impenetrable National Park and from an unclear locality labelled "Mbarara-valley, pond". In the Nyungwe National Park we found the yellow-fronted longleg along the stream in the Uwasenkoko Marsh. This species seems to be a high altitude species restricted to areas well above 1500 m a.s.l. Another gomphid – a species of the hooktail (*Paragomphus*) genus – was only found as larvae. The identification of larvae is still difficult for many African species, due to lack of material and identification literature. Nevertheless the whole genus of the hooktails has never been recorded for Rwanda before, so this is at least a new country record.

The potential sighting of a shadowcruiser (*Idomacromia*) at the Karamba Trail is an exciting addition and needs verification. Shadowcruisers are only known from two species in West and Central Africa and only in 2004 a species was described from East Africa based on two females caught in the Bwindi Impenetrable National Park (*Idomacromia jilliana*). All shadowcruisers are very elusive and difficult to collect. Dijkstra & Kisakye (2004) write that "it may take years before the male is discovered". More surveys are urgently needed to confirm this sighting.

The Nyungwe junglewatcher (*Neodythemis nyungwe*) (Fig. 3) was described in 2006, based on one museum specimen from the "Zoologische Staatssammlung Munich", Germany, which was collected at "Rwanda, Nyungwe National Park, Karamba, (2°30'S, 29°10'E), muddy pools and slow-flowing streamlets in rainforest, alt. ca 1,500 m a.s.l." (Dijkstra & Vick, 2006). There was no further information available for this highly endemic species. While few specimens were recorded along a stream in January 2016, we found more adults emerging in the swamp forests around Kamiranzovu Swamp (Fig. 2, 4, 5) in March 2016. The Nyungwe junglewatcher seems to be restricted to the Karamba trail and Kamiranzovu Swamp area in the Nyungwe Mts and the population should be monitored in the future.

Conservation

The three National Parks in Rwanda, Nyungwe, Akagera and Virunga, are currently well protected and do contain healthy populations of all threatened dragonfly species encountered during our trip. At the moment there is no reason to anticipate a decline in these species' populations and though they can all be named "conservation dependent" no action in respect to the National Parks is needed.

Outside National Parks hardly any natural habitats are left in Rwanda. Most of the land is used for small scale farming, some for large scale farming and in the drier areas in the north-east as pasture for cattle. Swamps and lakes do seem to be fairly natural, but they are heavily encroached and used as well. Papyrus is frequently burned in the dry season to gain access to the water and to get new land for agriculture. Despite the fact that the land outside National Parks is densely populated, the water quality away from cities and larger villages is still in a fair condition. These aquatic sites are important areas for a number of water-dependent species. Around cities, water pollution already poses a huge problem and is an immediate threat to aquatic habitats. Streams, rivers, swamps or lakes around urban areas are used as sewage and rubbish pits, to wash cars, lorries and motorcycles and as construction sites. With the increasing development of Rwanda the pressure on all aquatic sites will rise

tremendously over the next years, which will not only affect aquatic biodiversity, but also human well-being. The construction of sewage works and rubbish pits should parallel any rural and urban development. Awareness of the importance of healthy wetlands for human well-being needs to be brought to rural and urban communities. Use of pesticides and fertilizers needs to be controlled and the re-forestation of hilltops with indigenous species encouraged.

The ongoing population growth in Rwanda together with urbanization, land use intensification and industrialization are already putting a lot of pressure on Rwanda's aquatic sites. Hence we suggest the following measures should be implemented into legislation and/or carried out on the ground as soon as possible:

- control of the use of pesticides and fertilizers;
- construction of sufficiently sized sewage works at all larger settlements;
- protection of existing aquatic habitats, partially by law enforcement;
- reforestation of hill-tops and along streams and rivers with indigenous trees;
- banning of washing activities in aquatic habitats, paralleled by construction of washing places for clothes away from the water course to allow the water to seep through the soil.

References

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Figures 3-4. (3) The Nyungwe junglewatcher (*Neodythemis nyungwe*), which is endemic to swamp forest areas around Kamiranzovu Swamp in the Nyungwe National Park (see Fig. 4), January 2016, photo credit: André Günther. (4) The swamp forest around Kaimanzovu Swamp, where several Nyungwe junglewatchers were found hatching in March 2016, photo credit: Viola Clausnitzer.

Table 1. List of Rwanda's dragonflies (Odonata) with regional occurrence.

RL = Red List status 2016; 2016 = species recorded during the two short surveys in January and March 2016; new 2016 = new country records made during that surveys.

Species		Vernacular name	RL	Akagera	Musanze	Nyungwe	2016	new 2016
Zygoptera								
Lestidae								
<i>Lestes virgatus</i>	(Burmeister, 1839)	Smoky spreadwing	LC	x		x		
Calopterygidae								
<i>Umma saphirina</i>	Förster, 1916	Sapphire sparklewing	LC			x	x	x
Chlorocyphidae								
<i>Platycypha caligata</i>	(Selys, 1853)	Dancing jewel	LC	x				
<i>Stenocypha jacksoni</i>	(Pinhey, 1952)	Yellow-sided jewel	NT			x	x	
<i>Stenocypha tenuis</i>	(Longfield, 1936)	Slender jewel	LC			x	x	x
Platycnemididae								
<i>Allocnemis nigripes</i>	(Selys, 1886)	Rainbow yellowwing	LC			x	x	x
<i>Allocnemis pauli</i>	(Longfield, 1936)	Orange-tipped yellowwing	LC			x	x	x
Coenagrionidae								
<i>Aciagrion heterostictum</i>	Fraser, 1955	Long slim		x			x	x
<i>Africallagma elongatum</i>	(Pinhey, 1950)	Elongate bluet	LC	x	x	x	x	
<i>Africallagma pseudelongatum</i>	(Longfield, 1936)	Spotted bluet	LC	x	x	x	x	
<i>Africallagma vaginale</i>	(Sjöstedt, 1917)	Forest bluet	LC	x			x	x
<i>Agriocnemis gratiosa</i>	Gerstäcker, 1891	Gracious wisp	LC	x	x		x	
<i>Agriocnemis inversa</i>	Karsch, 1899	Highland wisp	LC	x			x	x
<i>Agriocnemis palaeforma</i>	Pinhey, 1959	Papyrus wisp	EN	x			x	x
<i>Azuragrion nigradorsum</i>	(Selys, 1876)	Sailing bluet	LC	x				
<i>Ceriagrion glabrum</i>	(Burmeister, 1839)	Common citril	LC	x			x	
<i>Ceriagrion platystigma</i>	Fraser, 1941	Variabel citril	LC	x			x	x
<i>Ischnura senegalensis</i>	(Rambur, 1842)	Common bluetail	LC	x		x	x	
<i>Proischnura subfurcata</i>	(Selys, 1876)	Fork-Tailed bluet	LC	x	x	x	x	
<i>Pseudagrion hamoni</i>	Fraser, 1955	Swarthy sprite	LC		x		x	
<i>Pseudagrion kersteni</i>	(Gerstäcker, 1869)	Powder-faced sprite	LC	x	x		x	
<i>Pseudagrion massaicum</i>	Sjöstedt, 1909	Masai sprite	LC	x			x	
<i>Pseudagrion nubicum</i>	Selys, 1876	Bluetail sprite	LC	x			x	
<i>Pseudagrion sp. nov.</i>						x	x	x
<i>Pseudagrion sjoestedti</i>	Förster, 1906	Variable sprite	LC	x			x	x
<i>Pseudagrion spernatum</i>	Hagen in Selys, 1881	Upland sprite	LC	x	x	x	x	
<i>Pseudagrion sublacteum</i>	(Karsch, 1893)	Cherry-eye sprite	LC	x	x		x	x
Anisoptera								
Aeshnidae								
<i>Afroaeschna scotias</i>	(Pinhey, 1952)	Shadow hawk	LC			x	x	x
<i>Anaciaeschna triangulifera</i>	McLachlan, 1896	Evening hawk	LC	x			x	
<i>Anax ephippiger</i>	(Burmeister, 1839)	Vagrant emperor	LC	x			x	
<i>Anax imperator</i>	Leach, 1815	Blue emperor	LC	x		x	x	
<i>Anax speratus</i>	Hagen, 1867	Orange emperor	LC	x				
<i>Anax tristis</i>	Hagen, 1867	Black emperor	LC	x		x	x	x
<i>Gynacantha villosa</i>	Grünberg, 1902	Brown dushawker	LC	x			x	
<i>Heliaeschna spec</i>		Duskhawker					x	x
<i>Zosteraeschna ellioti</i>	(Kirby, 1896)	Highland hawk	LC	x		x	x	
Gomphidae								
<i>Ictinogomphus ferox</i>	(Rambur, 1842)	Common tigertail	LC	x			x	
<i>Notogomphus flavifrons</i>	Fraser, 1952	Yellow-fronted longleg	VU				x	x
<i>Notogomphus gorilla</i>	Dijkstra, 2015	Gorilla longleg	VU				x	x
<i>Notogomphus lujai</i>	(Schouteden, 1934)	Albertine longleg	LC				x	x
<i>Paragomphus spec.</i>		Hooktail					x	x

Species		Vernacular name	RL	Akagera	Musanze	Nyungwe	2016	new 2016
Libelluloidea incertae sedis								
Macromiidae								
<i>Idomacromia</i> ?		Shadowcruiser					x	x
<i>Phyllomacromia contumax</i>	Selys, 1879	Two-banded cruiser	LC	x			x	x
Libellulidae								
<i>Acisoma trjfidum</i>	Kirby, 1889	Pied pintail	LC	x			x	x
<i>Acisoma variegatum</i>	Kirby, 1898	Slender pintail	LC	x			x	x
<i>Aethriamanta rezia</i>	Kirby, 1889	Pygmy basker	LC	x			x	x
<i>Atoconeura eudoxia</i>	(Kirby, 1909)	Fishtail highlander	LC			x	x	x
<i>Atoconeura pseudeudoxia</i>	Longfield, 1953	Hairy-legged highlander	LC	x				
<i>Brachythemis leucosticta</i>	(Burmeister, 1839)	Banded groundling	LC	x	x		x	
<i>Chalcostephia flavifrons</i>	Kirby, 1889	Inspector	LC	x			x	
<i>Crocothemis erythraea</i>	(Brullé, 1832)	Broad scarlet	LC	x			x	
<i>Crocothemis sanguinolenta</i>	(Burmeister, 1839)	Little scarlet	LC	x		x	x	
<i>Diplacodes lefebvreii</i>	(Rambur, 1842)	Black percher	LC	x		x		
<i>Diplacodes luminans</i>	(Karsch, 1893)	Barbet percher	LC	x			x	x
<i>Hadrothemis versuta</i>	(Karsch, 1891)	Variable jungleskimmer	LC	x				
<i>Hemistigma albipunctum</i>	(Rambur, 1842)	African pied-spot	LC	x	x		x	
<i>Neodythemis nyungwe</i>	Dijkstra & Vick, 2006	Nyungwe junglewatcher	CR			x	x	
<i>Nesciothemis farinosa</i>	(Förster, 1898)	Eastern blacktail	LC	x	x		x	
<i>Notiothemis jonesi</i>	Ris, 1919	Eastern forestwatcher	LC			x	x	x
<i>Orthetrum abbotti</i>	Calvert, 1892	Little skimmer	LC	x		x	x	
<i>Orthetrum brachiale</i>	(Palisot de Beauvois, 1805)	Banded skimmer	LC	x	x	x	x	
<i>Orthetrum caffrum</i>	(Burmeister, 1839)	Two-striped skimmer	LC		x	x	x	
<i>Orthetrum camerunense</i>	Gambles, 1959	One-striped skimmer	LC		x	x	x	x
<i>Orthetrum chrysostigma</i>	(Burmeister, 1839)	Epaulet skimmer	LC	x		x	x	
<i>Orthetrum guineense</i>	Ris, 1910	Guinea skimmer	LC	x	x			
<i>Orthetrum hintzi</i>	Schmidt, 1951	Dark-shouldered skimmer	LC	x				
<i>Orthetrum julia</i>	Kirby, 1900	Julia skimmer	LC	x		x	x	
<i>Orthetrum stemmale</i>	(Burmeister, 1839)	Bold skimmer	LC	x			x	x
<i>Orthetrum trinacria</i>	(Selys, 1841)	Long skimmer	LC	x			x	x
<i>Palpopleura deceptor</i>	(Calvert, 1899)	Deceptive widow	LC	x			x	x
<i>Palpopleura lucia</i>	(Drury, 1773)	Lucia widow	LC	x	x		x	
<i>Palpopleura portia</i>	(Drury, 1773)	Portia widow	LC	x	x	x	x	
<i>Pantala flavescens</i>	(Fabricius, 1798)	Wandering glider	LC		x	x	x	
<i>Parazyxomma flavicans</i>	(Martin, 1908)	Banded duskdarter	LC	x			x	
<i>Rhyothemis fenestrina</i>	(Fabricius, 1781)	Skylight flutterer	LC	x			x	
<i>Rhyothemis semihyalina</i>	(Desjardins, 1832)	Phantom flutterer	LC	x			x	
<i>Tramea basilaris</i>	(Palisot de Beauvois, 1805)	Keyhole glider	LC		x			
<i>Tetrathemis camerunensis</i>	(Förster, 1900)	Forest elf	LC	x			x	x
<i>Tholymis tillarga</i>	(Fabricius, 1798)	Twister	LC	x		x	x	x
<i>Trithemis annulata</i>	(Palisot de Beauvois, 1805)	Violet dropwing	LC	x	x		x	
<i>Trithemis arteriosa</i>	(Burmeister, 1839)	Red-veined dropwing	LC	x	x	x	x	
<i>Trithemis dichroa</i>	Karsch, 1893	Black dropwing	LC	x			x	x
<i>Trithemis donaldsoni</i>	(Calvert, 1899)	Denim dropwing	LC	x		x		
<i>Trithemis pluvialis</i>	Förster, 1906	Russet dropwing	LC	x			x	
<i>Trithemis stictica</i>	(Burmeister, 1839)	Jaunty dropwing	LC	x	x		x	
<i>Trithetrum navasi</i>	(Lacroix, 1921)	Fiery darter	LC	x			x	x
<i>Urothemis assignata</i>	(Selys, 1872)	Red basker	LC	x			x	
<i>Urothemis edwardsii</i>	(Selys, 1849)	Blue basker	LC	x			x	x
<i>Zygonyx natalensis</i>	(Martin, 1900)	Blue cascader	LC		x	x	x	
<i>Zygonyx torridus</i>	(Kirby, 1889)	Ringed cascader	LC				x	x
TOTAL	90			67	23	31	78	37