

## Critical species of Odonata in southern Africa

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### ABSTRACT

Of the 160 species in South Africa, 29 are endemic. Threats to the local odonate fauna have increased in recent years due to the growth of agriculture and impact of invasive alien trees. Currently, 13 species are red-listed as threatened. Among the activities to ameliorate threats, is a massive programme, 'Working for Water', to remove invasive alien plants. This has had an enormously beneficial effect on many of the threatened species.

### REGIONAL DEFINITION

Southern Africa is here defined as the nations of Lesotho, South Africa and Swaziland. This area covers various physio-climatic zones, and of particular note are the Cape Fold Mountains with their proportionately high levels of endemism. The neighbouring regions are covered to the north-west by Suhling et al. (2004) and to the north-east by Clausnitzer (2004).

### STATE OF THE ART

#### Current national species richness

To date, the number of Odonata species recorded for South Africa (with Lesotho and Swaziland) is 160. These figures to some extent reflect intensity of past collecting. They also do not have a great deal of biological meaning because political boundaries in the region largely do not follow physio-climatic zones, and are mostly the result of the vagaries of human history.

South Africa has 29 endemic species and five subspecies, making up 21% of its total odonate fauna.

#### Faunal lists and identification guides

Regional catalogues and taxonomic monographs for South Africa include Pinhey (1951, 1984, 1985), Brinck (1955), Samways (1999) and Hedge & Crouch (2000). Internationally-agreed common names for South African Odonata have been listed by Samways (2002a). DNA verifications of *Palpopleura lucia* (Drury, 1773) have

been undertaken (Mitchell & Samways 2004). Distributional data are being collated on databases for Namibian (Martens & Suhling 2003) and South African (Samways et al. 2003) species.

Tarboton & Tarboton (2002) produced a field guide to the South African Anisoptera. A guide to the larvae of southern African Odonata species was produced by Samways & Wilmot (2003), and an unpublished CD of Namibian larvae was issued (Suhling et al. 2003).

## CRITICAL SPECIES

Notes on the species previously listed by IUCN

On the IUCN Red List (IUCN 2003) eight species were listed for South Africa:

as endangered [EN]

*Chlorolestes apricans*, *Ecchlorolestes peringueyi*;

as data deficient [DD]

*Enallagma* (syn. *Proischnura*) *polychromaticum*, *Metacnemis angusta*, *Orthetrum rubens*, *Urothemis luciana*;

as least concern [LC]

*Chlorolestes draconicus* Balinsky, 1956, *Ecchlorolestes nylephtha* (Barnard, 1937).

No additional species were listed as priority species for South Africa by Moore (1997), but some species were listed in different threat categories:

*C. apricans*

critically endangered [CR] instead of endangered [EN];

*E. peringueyi*

vulnerable [VU] instead of endangered [EN];

*P. polychromatica*

critically endangered [CR] instead of data deficient [DD].

Additionally some species are categorized by Samways (2002b), but these had not been listed by the IUCN up to 2003 (IUCN 2003) (see also Table 1). South African species have also been given National categories (Samways 2004). A strategy for national red-listing has been given by Samways (2002a).

Current Red List status

There have been enormously increasing human pressures on southern African Odonata species in recent years. This is especially so in South Africa, where demand on scarce water supplies is high and co-incides with high proportions of endemism. Table 1 summarizes the current Red List status of southern African species to date. Three important points need to be made.

(1) This list is very dynamic and is based on the data we have to hand. The list needs to be revised regularly as appropriate as stipulated by IUCN.

Table 1. Threatened Odonata species in southern Africa, their current Red List or suggested, revised Red List status – in square brackets, and based on recent findings –, and distribution. The suggested categories are not on the Red List 2003 or are listed in a different category (IUCN 2003). CR: critically endangered; EN: endangered; VU: vulnerable; NT: near threatened; DD: data deficient. — Country codes: EaCa: Eastern Cape; WeCa: Western Cape; SoAf: South Africa; Mp: Mpumalanga; Mo: Mozambique; KwZu-Na: KwaZulu-Natal.

Family/species	Common name	Current Red List status	Distribution
<b>Synlestidae</b>			
<i>Chlorolestes apricans</i> Wilmot, 1975	Basking Malachite	EN	EaCa, SoAf
<i>Ecchlorolestes peringueyi</i> (Ris, 1921)	Marbled Malachite	[VU]	WeCa, SoAf
<b>Coenagrionidae</b>			
<i>Proischnura polychromatica</i> (Barnard, 1937)	Cape Bluet	[VU]	WeCa, SoAf
<i>Pseudagrion inopinatum</i> Balinsky, 1971	Balinsky's Sprite	[VU]	Mp, SoAf
<i>newtoni</i> Pinhey, 1962	Harlequin Sprite	[VU]	KwZu-Na and Mp, SoAf
<i>umsingaziense</i> Balinsky, 1963	Umsingazi Sprite	[VU]	KwZu-Na, SoAf
<b>Platycnemididae</b>			
<i>Metacnemis angusta</i> (Selys, 1863)	Ceres Stream Damsel	[EN]	WeCa, SoAf
<i>valida</i> (Hagen in Selys, 1863)	Kubusi Stream Damsel	[EN]	EaCa, SoAf
<b>Gomphidae</b>			
<i>Ceratogomphus triceraticus</i> Balinsky, 1963	Cape Thorntail	[VU]	WeCa, SoAf
<b>Corduliidae</b>			
<i>Syncordulia gracilis</i> (Burmeister, 1839)	Yellow Presba	[VU]	EaCa, WeCa, SoAf (formerly KwZu-Na?)
<i>venator</i> (Barnard 1933)	Mahogany Presba	[VU]	WeCa
<b>Libellulidae</b>			
<i>Orthetrum rubens</i> Barnard, 1937	Waxy-winged Skimmer	[DD]	WeCa, SoAf
<i>Urothemis luciana</i> Balinsky, 1961	St Lucia Basker	[VU]	Coastal KwZu-Na, Mo

(2) Red-listing is a precautionary approach rather than evidentiary. In other words, we ask whether there are indications that a particular species is under threat rather than waiting until evidence is so concrete that it is too late to do anything meaningful.

(3) Red-listing a species includes habitat conservation. In the case of Odonata of streams, this often means maintenance of regional catchment ecosystem processes intact. This has important implications in the Western Cape where more than one red-listed species may be present in a catchment, e.g. in the Palmiet River system.

Table 1 deserves some further comments:

*Chlorolestes draconicus* and *Ecchlorolestes nylephtha* are not on the Red List, because although thought to be highly threatened (Samways 1996) are now known to have populations that are in protected areas and safe, global climate change aside. *C. apricans* remains highly threatened and *E. peringueyi* is still vulnerable to invasive alien plants.

*Proischnura polychromatica* is extremely rare, but now known to be recovering through invasive alien tree removal, but is still vulnerable.

*Pseudagrion inopinatum* has recently been rediscovered but is highly vulnerable as its population level is low and its geographical distribution is so small. *P. newtoni* is only known from one population where invasive alien trees have been removed, and is highly vulnerable to alien tree regrowth and cattle damage to banks. *P. umsingaziense* has also been recently rediscovered but remains vulnerable to various anthropogenic pressures.

Table 2. Threats to red-listed Odonata species in southern Africa.

Family/species	Threat
Synlestidae	
<i>Chlorolestes apricans</i>	Habitat removal (replaced by livestock farming) and habitat change caused by invasive alien trees
<i>Ecchlorolestes peringueyi</i>	Habitat removal (replaced by forestry plantation and livestock farming), invasive alien trout, and invasive alien trees shading habitat
Coenagrionidae	
<i>Proischnura polychromatica</i>	Habitat removal (replaced by livestock farming, intensive agriculture) and impact from invasive alien trees
<i>Pseudagrion inopinatum</i>	Threats uncertain; may be extreme habitat specialist; habitat is heavily impacted by cattle and by some invasive alien trees
<i>newtoni</i>	Habitat removal. In particular, grazing by cattle of the tall riparian grasses, and by overgrowth with invasive alien trees, especially <i>Acacia mearnsii</i>
<i>umsingaziense</i>	Habitat removal (replaced by livestock farming, forestry plantations, and industrial development); mowing of lakeside grassy margins
Platycnemididae	
<i>Metacnemis angusta</i>	Habitat removal (replaced by intensive agriculture) and invasive alien trees.
<i>valida</i>	Habitat removal (replaced by livestock removal) and invasive alien trees
Gomphidae	
<i>Ceratogomphus triceraticus</i>	Habitat removal (replaced by livestock farming and plantation forestry), invasive alien trees and possibly pollution, over-extraction of water, and possibly trout
Corduliidae	
<i>Syncordulia gracilis</i>	Habitat removal (replaced by livestock farming and plantation afforestation), invasive alien trees (a major problem) and possibly trout
<i>venator</i>	Habitat removal (replaced by livestock farming and plantation afforestation), invasive alien trees, and possibly trout
Libellulidae	
<i>Orthetrum rubens</i>	Habitat removal (replaced by plantation forestry), invasive alien trees, and possibly trout
<i>Urothemis luciana</i>	Cattle overgrazing of habitat; building of new roads that impacts on hydrology

*Metacnemis angusta*, last seen in 1920, is now known from one small population where invasive alien trees have been removed. *M. valida* remains highly vulnerable and has retracted from many former sites.

*Ceratogomphus triceraticus* is vulnerable to invasive alien trees, as are both *Syncordulia gracilis* and *S. venator*.

*Orthetrum rubens* is of great concern as it has not been confirmed as extant for over 30 years.

*Urothemis luciana* is now known from localities both in KwaZulu-Natal and Mozambique and appears less threatened than formerly thought.

Detailed information on the conservation status on all South African species is given in Samways (1999), but for those species listed in Table 1 more information is now available which has changed the recent status of some of those species.

### CRITICAL SITES AND THREATS

It is the narrow-range endemic species of the montane areas of the Eastern and particularly the Western Cape that are highly threatened. The streams in this area are suffering multiple synergistic impacts from over-extraction of water, invasive alien riparian plants, cattle trampling and grazing of banks, housing development, various forms of pollution and, in places, by alien trout. Specific threats to individual species are given in Table 2.

### CONSERVATION PRIORITIES AND RECOMMENDATIONS

All the species listed in Table 1 require more searches to ascertain their exact distributions. Table 3 lists the species and the specific conservation measures required. There are some common themes. All the species except *Pseudagrion umsingaziense* are lotic species – although *Proischnura polychromatica* and *Metacnemis angusta* are associated with pools in river braids – and appear to be threatened by multiple impacts, the most serious of which is the effect of invasive alien trees (Kinvig & Samways 2000). These trees are being removed on a massive scale through the ‘Working for Water Programme’, the principal aim of which is to rehabilitate water supplies for human consumption. However, it has become clear that the programme also has enormous benefit for biodiversity recovery, and, in particular, for Odonata. There is preliminary evidence that this tree removal has become critical for several species. In fact, the only known site for *Pseudagrion newtoni* is where alien trees (principally *Acacia mearnsii*) have been removed and the long grass on the banks has recovered (Samways & Taylor 2004).

### CONSERVATION AWARENESS

It is well-established that effective conservation measures come about when there are enough people to support the measures required. Raising public awareness concerning invertebrates, including Odonata becomes a crucial feature in achieving such effective conservation (Samways 2002c). Odonata, through their beauty and

Table 3. Threatened Odonata species in southern Africa and the specific conservation measures they require.

Family/species	Conservation measures
<b>Synlestidae</b>	
<i>Chlorolestes apricans</i>	Removal of <i>Acacia mearnsii</i> under the 'Working for Water Programme' (WfWP) should continue. Fencing off certain areas of the stream to prevent cattle damaging the bank structure and riparian vegetation.
<i>Ecchlorolestes peringueyi</i>	Plantation forestry and trout invasion must be contained. Removal of invasive alien trees through the 'WfWP' is benefiting this species.
<b>Coenagrionidae</b>	
<i>Proischnura polychromatica</i>	Removal of invasive alien trees through the 'WfWP' essential. Containment of forestry encroachment and agriculture along stream braid margins.
<i>Pseudagrion inopinatum</i>	Prevention of further encroachment by commercial forestry. Removal of invasive alien trees.
<i>newtoni</i>	Fencing off portions of riverbank to prevent cattle damaging riparian grasses. Removal of invasive alien trees through the 'WfWP' essential.
<i>umsingaziense</i>	Maintenance of constant water levels in lakes (i.e. prevention of water table drop). Cessation of mowing of marginal grasses around urban lakes. Maintenance of indigenous trees, which provide shade midday, and which the species appears to require.
<b>Platycnemididae</b>	
<i>Metacnemis angusta</i>	Maintenance of pools in stream braids intact through alien tree removal.
<i>valida</i>	Removal of <i>Acacia mearnsii</i> through the 'WfWP' must continue. Reduction in agricultural disturbance upstream e.g. avoidance of bank damage from cattle and associated stream silting.
<b>Gomphidae</b>	
<i>Ceratogomphus triceraticus</i>	Removal of invasive alien trees through the 'WfWP'
<b>Corduliidae</b>	
<i>Syncordulia gracilis</i>	Removal of invasive alien trees, especially <i>Acacia longifolia</i> in the Western Cape and <i>Acacia mearnsii</i> in KwaZulu-Natal and Eastern Cape is critical. Containment of trout impact may also be important.
<i>venator</i>	Removal of invasive alien trees, especially <i>Acacia longifolia</i> , is critical. Containment of trout impact also important.
<b>Libellulidae</b>	
<i>Orthetrum rubens</i>	It is not clear why this species has declined. Removal of invasive alien trees may be important, as is possibly containment of trout impact.
<i>Urothemis luciana</i>	None specifically for this species in place. Benefits however, accrue from general biodiversity conservation in Maputaland.

conspicuousness, provide great opportunities for arousing interest in nature, and they 'stand in' for smaller, more obscure insects (Moore 1997). To this end there has been a strong awareness campaign in South Africa through high media impact, particularly in magazines and television, to address this issue. As children are the conservationists of the future, a dragonfly awareness trail was developed along with an associated booklet. Development of the trail, and its faunal composition, is described by Suh & Samways (2001). Changes in the odonate assemblages over time along this trail have been identified (Suh & Samways 2004).

## CURRENT ACTIVITIES

A very active research programme on Odonata conservation continues at the University of Stellenbosch. Based in KwaZulu-Natal, Augustine Suh is studying the phenology and long-term changes in lentic Odonata. Jenny Smith is comparing the South African Scoring System 5 – a river health monitoring methodology – for aquatic invertebrates at the family level with Odonata at the species level. In the Western Cape, Emile Bredenhand is studying the effect of a dam used in inter-basin transfer of water on aquatic invertebrates, including odonates. Paul Grant is undertaking a study of the Odonata of the Kogelberg, a remarkable node of endemic species. Meanwhile, Norma Sharratt, Remabuluwani Magoba, Stuart Taylor and Michael Samways are undertaking a large project under the auspices of the 'Working for Water Programme' to determine levels of recovery of Odonata and other fauna as invasive alien trees are removed. Mapping of South African Odonata continues, in collaboration with Steven Piper and Jemma Finch, and this feeds into fine-tuning the red-listing of species.

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