

### **Atlas of the European dragonflies and damselflies due to appear**

During the past decade over fifty European odonatologists have been co-operating to bring together all published and unpublished distribution records of the 143 European species of dragonflies and damselflies. The results of this endeavor will appear December 2015 in the Atlas European dragonflies and damselflies (Boudot & Kalkman 2015). The book includes over 200 distribution maps showing both the European and global distribution of the species. Further included is information on taxonomy, range, population trends, flight season-, habitat, photos of nearly all species and for each country an overview of the history of odonatological studies. The book can be pre-ordered for the reduced price of 60 euro's by sending an e-mail to [info@knnvuitgeverij.nl](mailto:info@knnvuitgeverij.nl) titled 'Special Offer Price Atlas of the dragonflies and damselflies of Europe'. Don't forget to mention your name. You will be contacted when the book is available so that you can order it directly via our webshop.

More information on the book, including a preview can be found on <http://www.knnvuitgeverij.nl/EN>.

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from agriculture and household sewage (e.g. Belgium), and also the construction of dams (e.g. Spain). Outside of those five countries half the European odonate fauna (68 species) receives no protection at all. With the exception of the species listed in the Habitats Directive, there are only a few species protected in more than one country. Only six species (*Lestes dryas*, *Aeshna isoceles*, *Aeshna subarctica*, *Anax imperator*, *Cordulegaster boltonii* and *Epitheca bimaculata*) are protected in four countries and all others are protected in less than three countries. Several European Red List species (Kalkman *et al.* 2010) and regionally threatened species remain entirely without protection.

Fifteen of the species listed in a threat category on the European Red List (including the Near Threatened) are not protected anywhere in Europe. Besides those five countries where all species are protected, only three species listed in a threat category on the European Red List receive some kind of national legal protection, namely *Lestes macrostigma* (Hungary, Slovenia), *Nehalennia speciosa* (Latvia, Poland, Switzerland) and *Sympetrum depressiusculum* (Hungary, Slovenia, Switzerland).

#### National Red Lists

National Red Lists give to a certain extent an indication of which species are considered threatened and/or declining in a certain country. In most cases they do not have any legal status, hence species listed are not necessarily protected. The methods used to make red lists vary greatly between countries, and are thus seldom directly comparable, providing only a limited overview of those species which are threatened throughout Europe. We were unable to obtain information on Albania, Belarus, Lithuania and the micro-states. Nine European countries do not have a national Red List of dragonflies, namely two Mediterranean islands (Cyprus and Malta), four countries from the former Yugoslavia (Bosnia & Herzegovina, Macedonia, Montenegro and Serbia), as well as Portugal, Romania and Iceland.

Species	Times mentioned in Red List
<i>Leucorrhinia pectoralis</i>	17
<i>Nehalennia speciosa</i>	15
<i>Ophiogomphus cecilia</i>	14
<i>Epitheca bimaculata</i>	13
<i>Leucorrhinia caudalis</i>	13
<i>Coenagrion lunulatum</i>	12
<i>Coenagrion mercuriale</i>	12
<i>Somatochlora arctica</i>	12
<i>Sympetrum depressiusculum</i>	12
<i>Coenagrion hastulatum</i>	11
<i>Aeshna subarctica</i>	11

Table 7. The ten species that are most often listed in the different national Red Lists of European countries (n=28) (status January 2012).

More than 70 % of all European dragonfly species are mentioned in at least one of the national Red Lists. An overview of the 10 most listed species (Red List categories: Critically Endangered, Endangered or Vulnerable) is given in table 7. Except for *Coenagrion mercuriale*, all nine other species have a clearly northern and central European distribution. Surprisingly, only two of the 10 species are listed in a threat category in the European Red List (Kalkman *et al.* 2010): *Sympetrum depressiusculum* is Vulnerable in Europe and *Nehalennia speciosa* is Vulnerable in EU27 and Near Threatened in Europe. In addition *Coenagrion mercuriale*, *C. ornatum* and *Leucorrhinia caudalis* are mentioned as Near Threatened in Europe or in EU27. These findings can be explained by populations decreasing in large parts of Europe, while remaining widespread in many areas to the north and east, most notably Fennoscandia and Russia, so that they do not meet the IUCN criteria for listing. Many rather common European species are on the Red List in countries where they are found at the

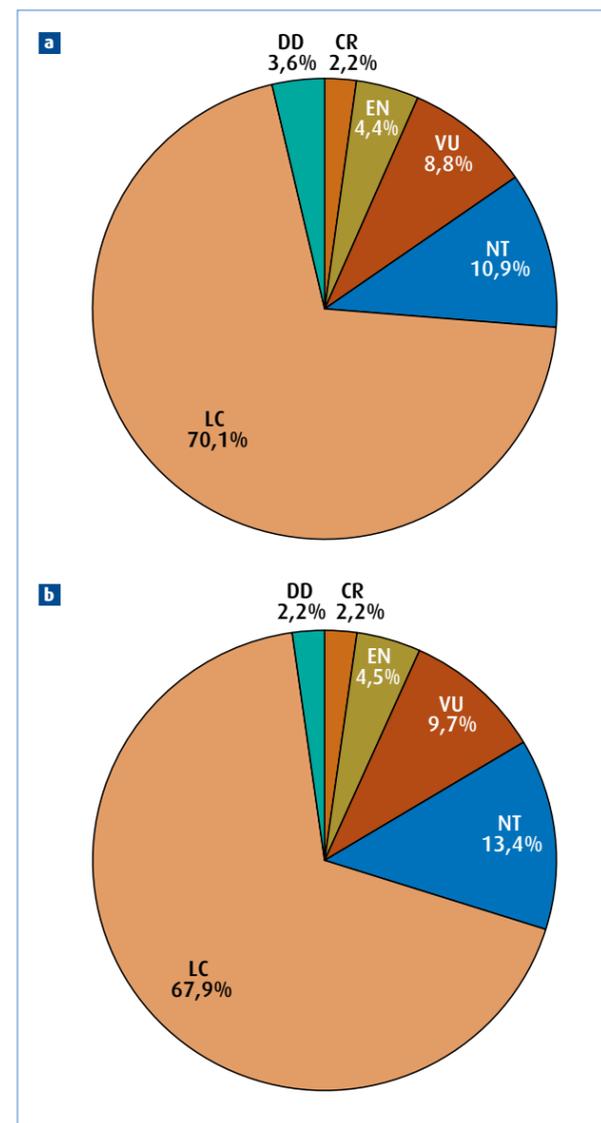


Figure 12. Red List status of dragonflies in Europe (a) and in the EU27 (b) (Kalkman *et al.* 2010).

IUCN Red List categories	No. (sub) species Europe (no. endemic species)	No. species EU 27 (no. endemic species)
Critically Endangered (CR)	3 (2)	3 (1)
Endangered (EN)	5 (3)	6 (3)
Vulnerable (VU)	13 (3)	13 (2)
Near Threatened (NT)	15 (4)	18 (2)
Least Concern (LC)	96 (6)	91 (6)
Data Deficient (DD)	5 (0)	3 (0)
Total number of threatened taxa	36 (12)	40 (8)
Total number of (sub)species assessed*	137 (18)	134 (14)
Not Applicable (NA)	5	5
Not Evaluated (NE)	0	3
Total All species	142	142

Table 8. Summary of the numbers of dragonfly species within each IUCN category of threat (Kalkman *et al.* 2010). \*Excluding species that are considered Not Applicable

edge of their distribution. Only four common species, *Chalcolestes viridis*, *Coenagrion puella*, *Ischnura elegans* and *Crocothemis erythraea* do not appear in any national Red List in Europe.

#### European Red List

The status of all native and vagrant dragonfly species in Europe (excluding those accidentally introduced) was assessed in 2009, based on the 'Guidelines for Application of IUCN Red List criteria at Regional Levels' (IUCN 2003, Kalkman *et al.* 2010). Assessments were made at two regional levels: for the 27 then member states of the European Union and for geographical Europe which, unlike this atlas, excluded the northern part of the Caucasus. Although the European Union now includes 28 member states, the assessment of conservation status was made only for the 27 member states in 2010. In total the conservation status in Europe of 133 species was assessed. Two of these (*Cordulegaster helladica* and *Onychogomphus forcipatus*) each have three subspecies with a taxonomy and distribution sufficiently well known to allow each to be assessed separately. Therefore, in total, 137 taxa (species and subspecies) were assessed.

At the European geographical level, 26 % of the assessed (sub)species of dragonflies are threatened, with 2 % Critically Endangered, 4 % Endangered, 9 % Vulnerable and 11 % Near Threatened. Within the EU27, the pattern is similar: 30 % of the taxa are threatened (Table 8, Figure 12). Over half the European taxa is considered stable (54 %), about a quarter (24 %) is declining and 10 % is increasing. For the remaining 12 %, the available information is insufficient to identify any trend. Most of the threatened species (18 of the 22) are confined to southern Europe (Figure 13). The exceptions are *Coenagrion hylas*, *Ischnura hastata*, *Nehalennia speciosa* and *Sympetrum depressiusculum*. In Mediterranean Europe, there is a very clear concentration of threatened species in the Balkan region and Crete, with twelve of the 22 threatened European taxa not occurring in other parts of Europe. A second concentration of threatened taxa is found in the Iberian

Peninsula and southern France, with four threatened species largely confined to this area. Europe is especially responsible for the eighteen species that are endemic to Europe (Table 5). Of these 14 are only found in the EU27 (Figure 14). Sixteen of the 18 endemics are either confined to islands, the Balkan Peninsula or to a large extent to the Iberian Peninsula and France.

#### Species protection

Dragonflies are on average not as severely threatened as certain other groups such as amphibians (Temple & Cox 2009) but nonetheless some dragonfly species need conservation efforts to prevent national or regional extinction. Many of these threatened species are habitat specialists throughout their range while others are habitat specialists in the periphery of their range but not in the core of their range. A good example of this is the damselfly *Coenagrion hastulatum*, which is a typical species of soft oligotrophic waters in the western part of its range but inhabits a much wider range of habitats in northeastern Europe (Figure 15). As a consequence, this species is threatened in e.g. the Netherlands (Termaat & Kalkman 2012), Belgium (De Knijf *et al.* 2006) and Great Britain (Daguet *et al.* 2008), whereas it is fairly common and widespread in countries like Poland and Sweden.

Protection programs focused on dragonflies have been launched in several European countries. They differ in the number of species included, the geographical scale (national, regional or local) and the scientific level of the research on which recommendations are based. Some of the programs have been published as national species protection plans (*Aeshna viridis* – de Jong *et al.* 2001, *Somatochlora arctica* – Ketelaar *et al.* 2005, *Oxygastra curtisii* – Ott *et al.* 2007). Conservation measures are also mentioned in many other publications with a broader scope, such as national or regional atlases, local habitat restoration plans, and in a wide range of research articles. It is unrealistic to list all of these but some deserve special attention. Probably the first overview of the habitat requirements, threats and conservation of all central European species was given

by Schorr (1990). A large amount of detailed information on dragonfly species in general, including conservation measures, can be found in the books on the dragonflies of Baden-Württemberg (Sternberg & Buchwald 1999, 2000) and in Moore (1997). A practical guide to the management and restoration of all dragonfly habitats occurring in Switzerland was provided by Wildermuth & Kürty (2009a, b). Much has been published on the conservation of *Coenagrion mercuriale*, a species mentioned in the Annexe II of the Habitats Directive. This included scientific articles on the ecology, genetic variation and dispersal behaviour of this species in the United Kingdom (e.g. Purse *et al.* 2003, Rouquette & Thompson 2005, 2007, Watts *et*

*al.* 2005). It is perhaps alarming that no species protection programs have so far been published for the dragonfly species mentioned in the European Red List (Kalkman *et al.* 2010), although measures have been carried out on a local scale for a few of them.

The threats dragonflies face are almost exclusively caused by quantitative and qualitative loss of habitat. This basically means that protecting a dragonfly species can only succeed by protecting its habitat. Water quality improvement, restoring the natural water regime and water table, the creation of new water bodies, restoration of running waters and vegetation management are among the most effective conservation measures for dragonflies. In this respect a dragonfly

species does not stand alone: other organisms benefit from these measures as well and dragonflies in their turn may benefit from measures taken for other fresh water species. From a dragonfly's point of view however, it is advisable to phase the removal of (semi-)aquatic vegetation over time and space. This minimizes the risk of accidentally wiping out a population and reduces the time in which dragonfly larvae are able to recolonize the restored parts of their habitat.

#### Threats to and changes in the European dragonfly fauna

Threats to European dragonflies vary regionally and have changed over time. During most of the twentieth century, large scale land conversion, canalisation of rivers, water pollution and eutrophication were the main drivers of decline, especially impacting species dependent on mesotrophic stagnant or running waters. Declines were particularly severe in western Europe from the 1950s to the 1980s, resulting in the extinction of several species over large areas.

A few decades ago, several lotic odonate species were

rare and threatened, as water quality in European rivers and streams was very poor. As a consequence of increased water purification in sewage treatment plants, most rivers and streams have improved in quality since the 1990s. This had a clear positive impact and many of the species dependent on running waters have recovered surprisingly rapidly. Species such as *Calopteryx splendens*, *C. virgo*, *Gomphus vulgatissimus* and *G. flavipes* repopulated streams where they had been absent for decades and even were able to colonise waterways where they had never been present. In many countries they recovered to such an extent that they no longer qualified for the national or regional Red List (Figure 16). It is likely that the recovery of running water species will continue due to the implementation of the Water Framework Directive which will probably result in a further improvement in water quality and the structural integrity of habitats. Recently it has also become clear that species dependent on meso-eutrophic waters, such as *Aeshna isoceles*, *Brachytron pratense* and even more critical species such as *Leucorrhinia caudalis* and *L. pectoralis* are also recovering in large areas of Europe.



Figure 15. *Coenagrion hastulatum* is one of the species which is not uncommon in the core of its range but rare and declining at the margins.



Figure 16. *Gomphus flavipes* showed a strong decline during the 20<sup>th</sup> century and was considered one of the most threatened European species. It has however shown a strong recovery since the 1990<sup>th</sup> and is currently considered of least concern on the European red list.

A remaining concern is the situation of species dependent on oligotrophic habitats such as bogs and fens, as many of these nutrient poor waters are still threatened in large parts of Europe. In some regions these habitats are negatively affected by the still elevated deposition of atmospheric nitrogen which leads to changes in vegetation composition. Other factors, such as desiccation due to drainage and ground water extraction, are also having a negative impact in many regions. These habitats are largely restricted to areas with a temperate or boreal climate and are restricted to the northern half of Europe and to higher altitudes in central and southern Europe. Especially in the latter the impact of climate change is expected to be severe. Changes in the pattern of rainfall during the last two decades has led to an increased frequency and duration of droughts in spring and summer and this has locally led to the desiccation of fens and peat bogs, resulting in the local extinction of odonate and other aquatic species.

In contrast to western and central Europe, threats to dragonflies in the Mediterranean region are rapidly increasing. Not only do the Mediterranean dragonflies have generally a smaller distributional range but they also often have a strong preference for running waters which are strongly impacted by human activity throughout the region. Due to this, 18 of the 22 dragonflies species currently threatened in Europe occur preferentially in the Mediterranean Basin. Mediterranean species are especially affected by a greater demand for water for agriculture and for the growing (tourist) population, as well as by the increased frequency and duration of hot, dry periods (Kalkman *et al.* 2010). Riverine species are affected by the construction of dams and reservoirs as well as by desiccation of their habitats. Several of those species occur in brooks and seepage systems which can easily be destroyed by single local events such as the extraction of water for local agriculture or domestic use.

Throughout Europe many conservation measures have been undertaken, such as the restoration of peat-bogs, ponds, gravel pits or brooks and these have had many positive effects on odonates. The creation of several types of novel water-bodies such as excavation pits and garden ponds has resulted in the availability of new habitats for many aquatic insects. As dragonflies are good indicators of environmental and landscape diversity and quality, and as they have a short life cycle, they react rapidly to changes in their habitats. They also have a high dispersal capacity and are capable of swift colonisation of new habitats. In addition, the effects of climate change have become apparent in the past two decades, with several southern species showing a northwards expansion. Best known examples of this are *Crocothemis erythraea* which colonized central and northern Europe in the 1990s and several African species, such as *Trithemis annulata* and *T. kirbyi*, which in the past

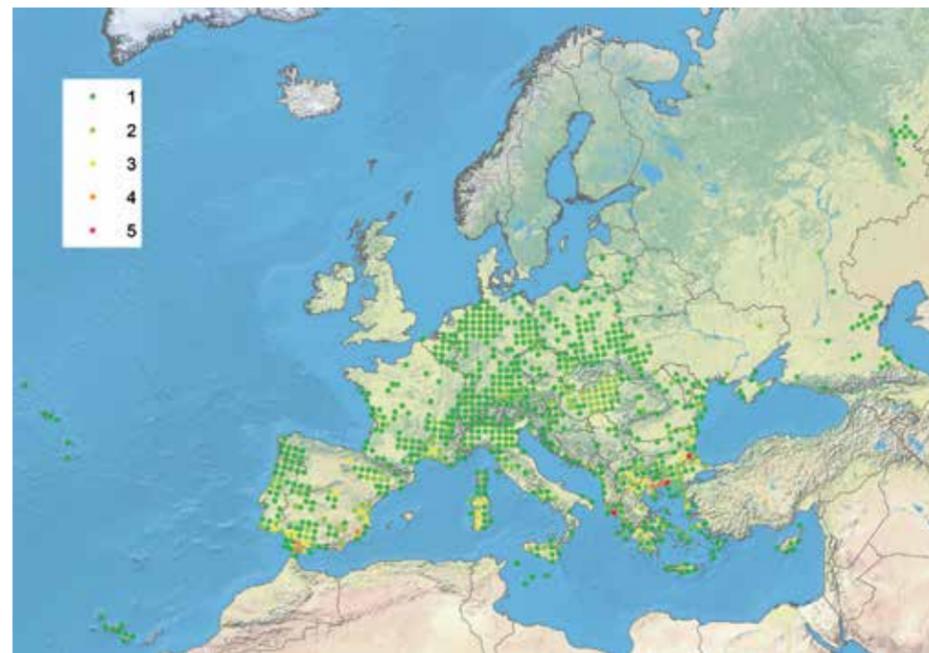


Figure 13. Distribution of threatened dragonflies in Europe (Kalkman *et al.* 2010).

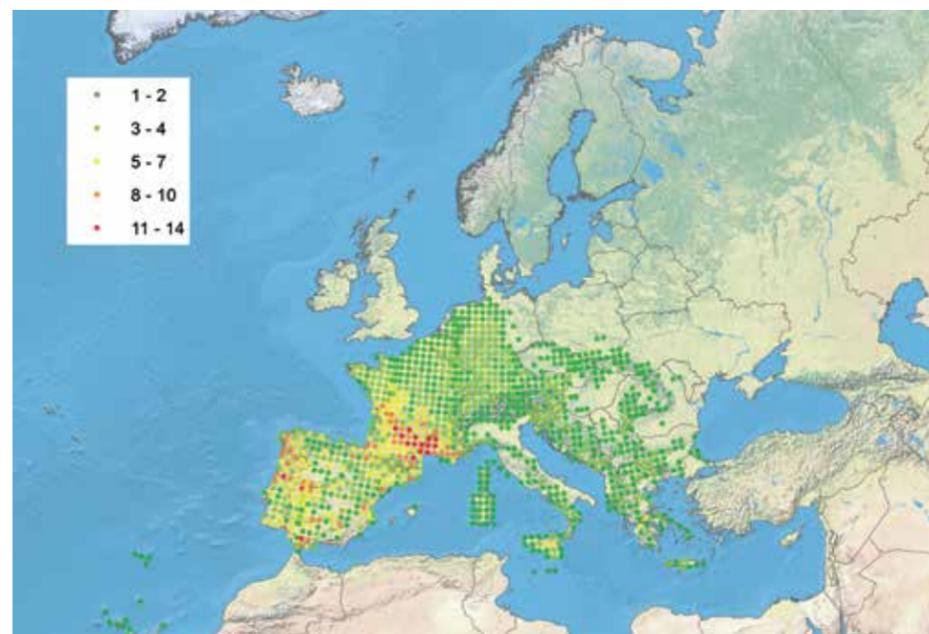


Figure 14. Distribution of endemic dragonflies in Europe (Kalkman *et al.* 2010).

Habitats Directive	No
Red List EU27	Endangered
Red List Europe	Endangered
Red List Mediterranean	Near Threatened
EU27 endemic	No
European endemic	No
Trend Europe	Decreasing

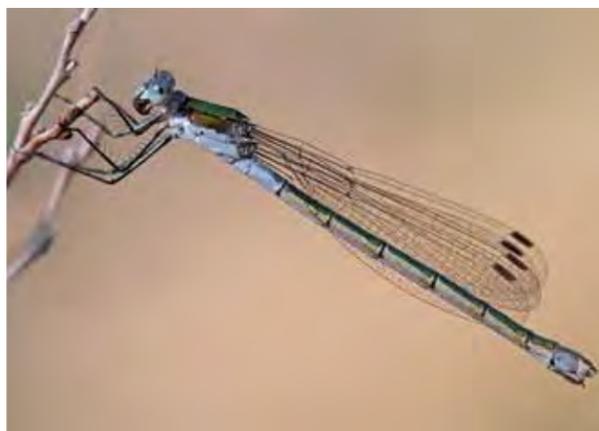
**Habitat**

*Lestes macrostigma* is largely confined to large coastal and inland brackish wetlands with low rainfall and high evaporation, mostly in lowland areas. Reproduction takes place in shallow brackish waters with a dense vegetation of Sea clubrush (*Bolboschoenus maritimus*), Common clubrush (*Schoenoplectus lacustris*) or Sea rush (*Juncus maritimus*) (Lambret *et al.*

2009, Lambret 2010). Larvae develop in temporary waters such as abandoned salt-pans, salt marshes and dune and steppe lakes with salinity up to 20-22 ‰ (Lambret *et al.* 2009). The combination of salinity and desiccation makes the habitat unsuitable for many other species of invertebrates or vertebrates, hence interspecies competition and predation is reduced. The larvae grow quickly in the warm waters and emergence takes place before the habitat is desiccated. Either the early desiccation of breeding sites or an above average amount of rainfall in summer can make the habitat unsuitable for the species, resulting in strong annual fluctuations in population density. Reproduction of this species in freshwater has been claimed to occur in Corsica (Grand & Dommaget 2007), but low salinity of this habitat has not been confirmed by chemical analysis.

***Lestes sponsa* (Hansemann, 1823)**

J.-P. Boudot & R. Raab



**Distribution**

World: *Lestes sponsa* is found from western Europe to Japan and is generally common within its range.

Europe: This species is common and widespread throughout Europe with the exception of the Mediterranean and northern Fennoscandia. It is rare on the Mediterranean coasts and is often confined to higher elevations in the south of its range.

**Trend and conservation status**

In Great Britain, *L. sponsa* has expanded its range about 140 km northwards since 1970, which was attributed to global warming (Hickling *et al.* 2005). A decline has been noted in some areas of western Europe, and in the Netherlands a decrease in abundance of 38 % was measured between 1999 and 2009. It is unlikely that this decline occurred over large areas in Europe and the species was considered to be stable on the European level in the 2010 European Red List.

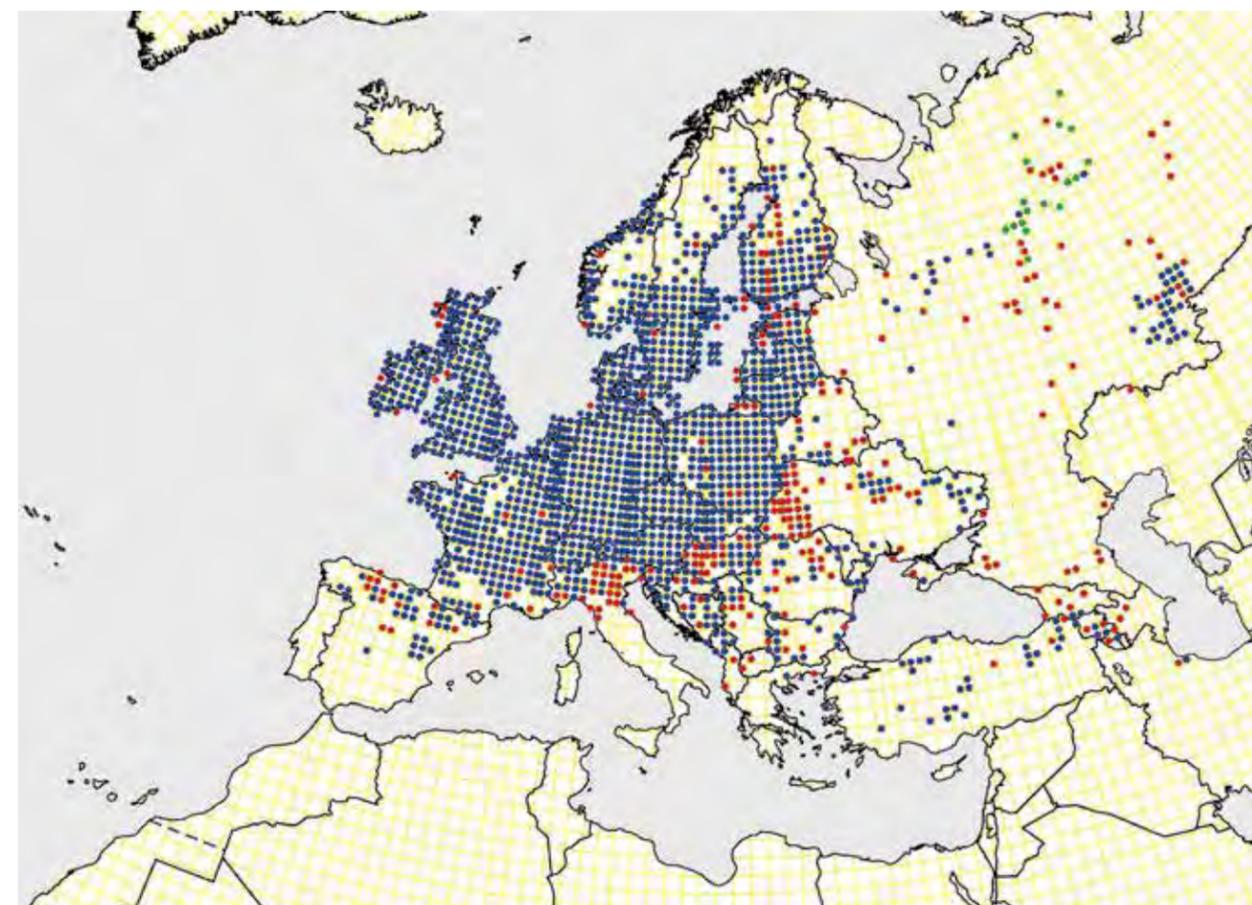
Habitats Directive	No
Red List EU27	Least Concern
Red List Europe	Least Concern
Red List Mediterranean	Least Concern
EU27 endemic	No
European endemic	No
Trend Europe	Stable

**Habitat**

*Lestes sponsa* inhabits a wide range of standing, largely unshaded waters with emergent vegetation, including ditches, ponds, lakes and peat bogs. This includes

both permanent and temporary waters and waters that are acidic, alkaline or brackish. It can be numerous at newly created shallow habitats but most often

occurs at well-vegetated waters. *Lestes sponsa* has a wide altitudinal range and reproduces from sea level up to 2 500 m.



European distribution



World distribution

**Flight period**

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Norway & Sweden												
Netherlands												
Bavaria, Germany												
France, north												
France, south												
Bulgaria & Greece												

Based on 25 records

# Lestes virens (Charpentier, 1825)

J.-P. Boudot & C. Willigalla



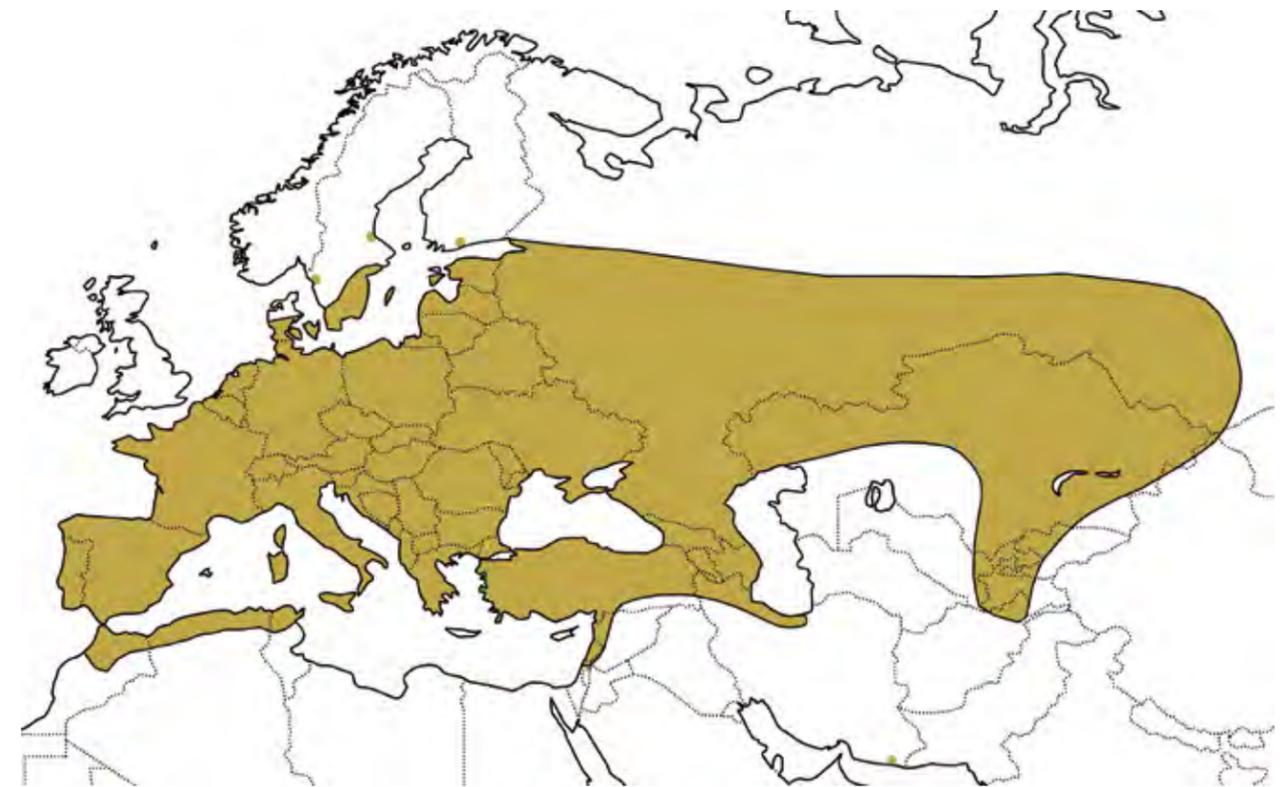
### Taxonomy

Jödicke (1997) summarised the information on the subspecies of *Lestes virens* and showed that their distribution and identification is not clear. Traditionally, the European populations are divided in two subspecies, with *L. v. virens* found in the south-

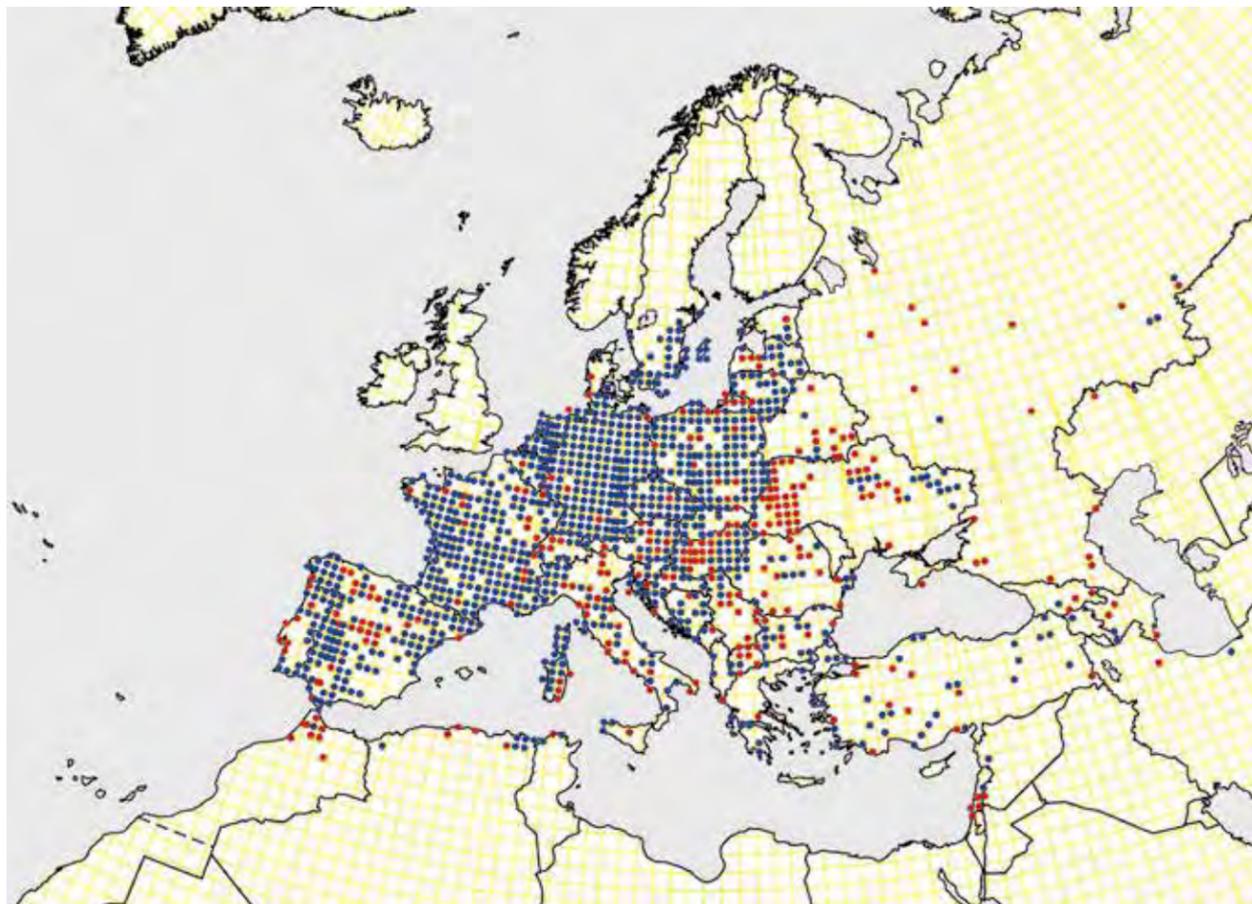
west and *L. v. vestalis* in the rest of Europe. The identification of these subspecies in their contact zone is often not possible. Some populations in south-east Europe resemble *L. v. marikovskii* Belyshev, 1961 which was originally described from eastern Kazakhstan, but it is unclear if these populations and the populations found in adjacent south-west Asia belong to that subspecies. This situation is further complicated by the discovery of two genetically distinct and seasonally segregated (and thus reproductively isolated) taxa belonging to the *L. virens* group in Algeria. One was described as a new species, *L. numidicus*, while the other was recognised as conspecific with *L. virens virens* (Samraoui *et al.* 2003, Samraoui 2009). A molecular study is needed to determine the taxonomic status of these taxa as well as those from Turkey and the Levant.

### Distribution

World: *Lestes virens* ranges from western France, Iberia and northern Africa to Central Asia. To the south, the species is present in the Maghreb, in the Levant and from Turkey to the north-west of Iran.



World distribution



European distribution

### Flight period

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Netherlands												
Germany, south												
France, north												
Bulgaria & Greece												

Europe: This species is widespread in Europe but the density of populations varies greatly between regions and the species is rare in relatively large areas. Its northern limit reaches the south of Sweden and the Baltic States with a single recent record known from the coast of southern Finland. Remarkably, it is absent from the Great Britain and Ireland although suitable habitats and climate seem to be present in these countries.

### Trend and conservation status

*Lestes virens* has extended its range northward, probably partly caused by climate change, and it has become more abundant in the Netherlands, Germany and Sweden. In recent years in parts of the western Mediterranean low rainfall in autumn and winter has resulted in pools drying out in spring and this might have resulted in a decline of the species.

Habitats Directive	No
Red List EU27	Least Concern
Red List Europe	Least Concern
Red List Mediterranean	Least Concern
EU27 endemic	No
European endemic	No
Trend Europe	Stable

### Habitat

*Lestes virens* is found in a variety of standing waters, either seasonal or permanent, particularly in lakes, ponds bordered with bushes, reeds, rushes, sedges and grasses, marshes and brackish swamps, and also in acidic peat bogs. The water bodies are often located in the vicinity of forests, where they are sheltered from the wind. They need to be exposed to direct sunlight and are often shallow. The species is most common in lowlands, although it has been found up to 1 400 m in the south of its range.



**1 *Ischnura hastata*.** Habitat *Ischnura hastata*, Sao Jorge, Azores, Portugal with the mountain of Pico in the background. Other species occurring here include *Anax imperator*, *Ischnura pumilio* and *Sympetrum fonscolombii*. Photograph Adolfo Cordero.



**2 *Nehalennia speciosa*.** Habitat *Nehalennia speciosa*, Lisia Kepa Sierzno, Poland. Other species occurring here include *Aeshna grandis*, *A. subarctica*, *Coenagrion hastulatum*, *C. puella*, *Enallagma cyathigerum*, *Leucorrhinia dubia* and *Sympetrum danae*. Photograph Dawid Tatarkiewicz.



**3 *Coenagrion glaciale*.** Habitat *Coenagrion glaciale*, Maletino, European Russia. Other species occurring here include *Aeshna crenata*, *A. grandis*, *A. juncea*, *Coenagrion johanssoni*, *Cordulia aenea*, *Leucorrhinia dubia* and *Libellula quadrimaculata*. Photograph Boguslaw Daraż.



**4 *Ischnura intermedia*.** Habitat *Ischnura intermedia*, Diarizos valley, Cyprus. Other species occurring here include *Calopteryx splendens*, *Epallage fatime*, *Ischnura elegans*, *Orthemum brunneum*, *O. chrysostigma*, *Sympecma fusca* and *Trithemis festiva*. Photograph Geert De Knijf.



**5 *Coenagrion johanssoni*.** Habitat *Coenagrion johanssoni*, Margitrännan, province of Jämtland, Sweden. Other species occurring here include *Aeshna caerulea*, *A. grandis* and *Coenagrion hastulatum*. Photograph Magnus Billqvist.



**6 *Pyrrhosoma elisabethae*.** Habitat *Pyrrhosoma elisabethae*, river one kilometer south-southeast of Sidari, Corfu, Greece. Other species occurring here include *Brachytron pratense*, *Calopteryx virgo*, *Coenagrion puella*, *C. pulchellum*, *Ischnura elegans*, *Libellula fulva* and *Platycnemis pennipes*. Photograph Christophe Brochard.



**7 *Ischnura senegalensis*.** Habitat *Ischnura senegalensis*, El Monte, Tenerife, Spain. Other species occurring here include *Anax imperator*, *Crocothemis erythraea* and *Sympetrum fonscolombii*. Photograph Valentina Assumma.



**8 *Coenagrion armatum*.** Habitat *Coenagrion armatum*, Hyby, province of Skåne, Sweden. Other species occurring here include *Aeshna isoceles*, *Leucorrhinia rubicunda* and *L. pectoralis*. Photograph Magnus Billqvist.

## Ceriagrion georgifreyi Schmidt, 1953

V.J. Kalkman



### Taxonomy

*Ceriagrion georgifreyi* has variously been considered a subspecies of *C. tenellum* or as a distinct species. As both male and female show distinct structural characters, it is now recognised as a full species (Schneider 1986, Kalkman 2005).

### Distribution

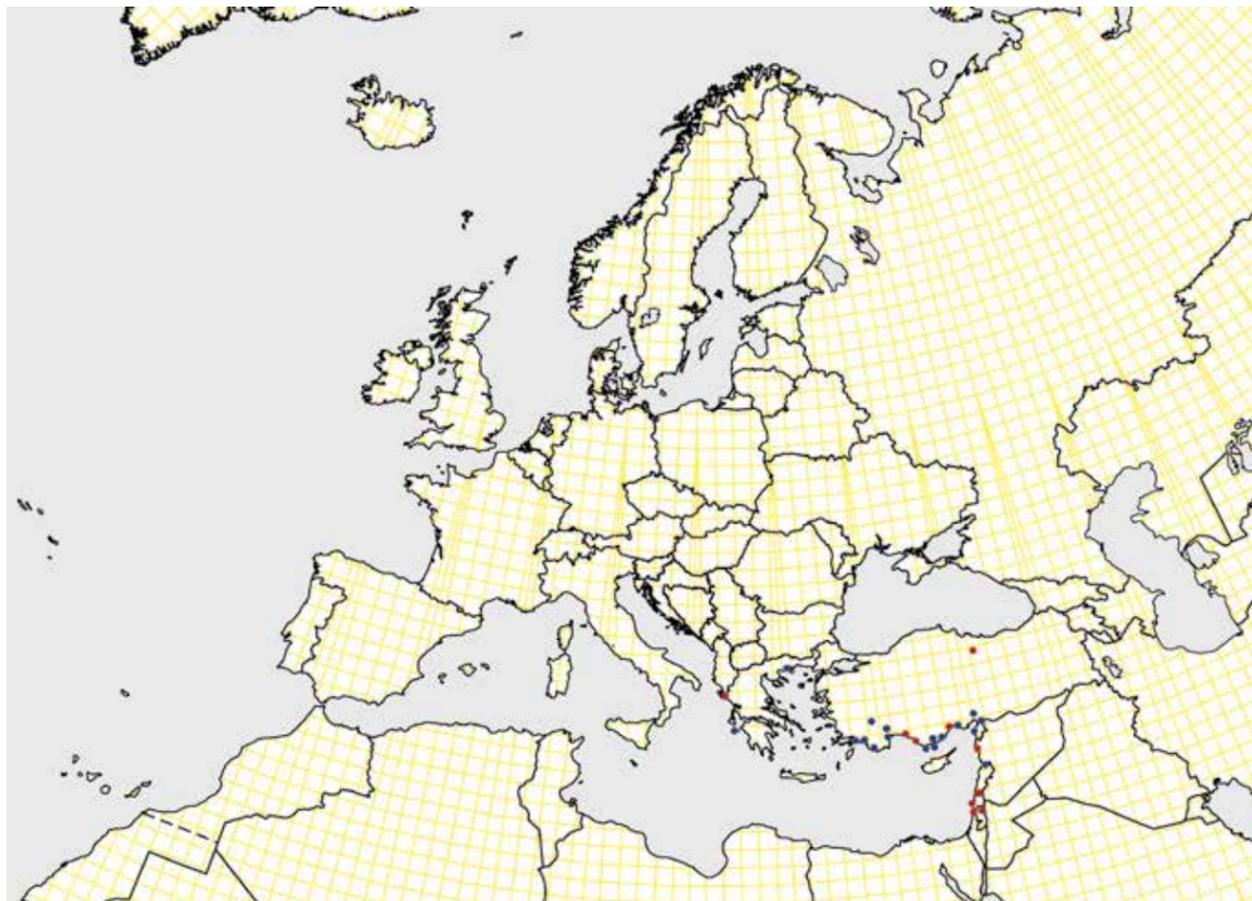
World: *Ceriagrion georgifreyi* has a relatively small range and occurs along a narrow coastal strip in the northern half of Israel, western Syria, southern Turkey

and three Greek islands. A record of *C. georgifreyi* from Niksar in north Turkey was reported by Schneider (1986) based on a series from the Royal Scottish Museum, Edinburgh. This population is the northernmost known to date, although a labelling error or a confusion of localities bearing the same name cannot be ruled out.

Europe: In Europe the species is only known from three Greek islands. From each, only a single record is available: Kerkyra (1971), Thasos (1997) and Zakynthos (1998) (Kalkman 2005). Records of *Ceriagrion* from Lesbos and from continental Greece published as *C. tenellum* may refer to *C. georgifreyi*. No voucher specimens are available for these records and fieldwork needs to be undertaken to establish the true identity of these populations.

### Trend and conservation status

The reproduction sites occupied by *C. georgifreyi* are generally small and easily destroyed by agriculture and building activity. Climate change resulting in the desiccation of habitats is the main present and future threat and will affect the species over its whole range. Presently, only three European localities are known for this



World distribution

### Flight period

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Bulgaria & Greece														Based on 4 records
Turkey														Based on 39 records

taxon. For none of them is information on population size, size of the habitat and conservation status available. It seems likely, however, that all European populations are small and can probably be destroyed by a single minor event such as the construction of a house, increased extraction of water or a very dry year. In order to prevent this species from becoming extinct in Europe, immediate actions are needed.

Habitats Directive	No
Red List EU27	Critically Endangered
Red List Europe	Critically Endangered
Red List Mediterranean	Vulnerable
EU27 endemic	No
European endemic	No
Trend Europe	Decreasing

### Habitat

*Ceriagrion georgifreyi* is poorly known and there are no detailed accounts of the habitats occupied in Europe. On the Turkish south coast, the species is found at slowly flowing, muddy streams and at the grassy and marshy margins of mostly small standing waters (Dumont 1977, Hope 2007, Kalkman *et al.* 2004). Localities where Hope (2007) assumed breeding were heavily vegetated with spikerushes (*Eleocharis*) and Water parsnip (*Berula erecta*). Based on the above and unpublished records, the habitat can best be described as streams, runnels, seepages and ponds with rich aquatic vegetation. The species only occurs at low altitudes.

## Ceriagrion tenellum (Villers, 1789)

V.J. Kalkman & A. Šalamun



its range extends widely into north-west Europe. To the north it reaches the south of Great Britain, the Netherlands and northern Germany. It has recently expanded its range eastwards to Brandenburg, with the first record made in 2008 (Brauner 2009). It is widespread in Italy but becomes rare and patchily distributed east of the Adriatic Sea in Slovenia, Croatia, Bosnia and Herzegovina, Montenegro and Albania. Its occurrence in mainland Greece and Lesbos is uncertain, as published records may result from confusion with *C. georgifreyi*. It is found with certainty on Crete and the nearby island of Ios

### Trend and conservation status

*Ceriagrion tenellum* is in most of its range not threatened and has not shown a decline over larger areas. It seems stable in the Iberian Peninsula and France, and has increased recently in Belgium, the Netherlands and northern Germany, possibly due to the increased summer temperatures. It declined significantly during the second part of the 20th century in some areas of Ger-

### Distribution

World: Outside Europe, the species is found only in north-west Africa. Over 98 % of known localities occur within Europe.

Europe: This Atlanto-Mediterranean species is widespread in the western Mediterranean basin, from where

### Flight period

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
France														
Bulgaria & Greece														
Turkey														