

## On the increase of *Hydrovatus cuspidatus* (Kunze, 1818) and *Graptodytes bilineatus* (Sturm, 1835) (Coleoptera: Dytiscidae) in Belgium

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### Abstract

*Hydrovatus cuspidatus* (Kunze, 1818) and *Graptodytes bilineatus* (Sturm, 1835) have always been very rare in Belgium, but recently, both species have known a rapid expansion. In this article, the distribution, trend and habitat in Belgium of both species are described and discussed.

**Keywords:** Dytiscidae, *Hydrovatus cuspidatus*, *Graptodytes bilineatus*, expansion, Belgium.

### Samenvatting

*Hydrovatus cuspidatus* (Kunze, 1818) en *Graptodytes bilineatus* (Sturm, 1835) zijn in België steeds zeer zeldzame soorten geweest. Recent zijn beide soorten echter op korte tijd zeer sterk toegenomen. In dit artikel worden de verspreiding, trend en habitat van beide soorten beschreven en besproken.

### Résumé

*Hydrovatus cuspidatus* (Kunze, 1818) et *Graptodytes bilineatus* (Sturm, 1835) ont été, jusqu'à présent, des espèces très rares en Belgique. Récemment cependant, la présence des deux espèces a augmenté considérablement et ce, dans un court laps de temps. Dans cet article, la distribution, les tendances et l'habitat des deux espèces sont décrits et discutés.

### Introduction

*Hydrovatus cuspidatus* (Kunze, 1818) and *Graptodytes bilineatus* (Sturm, 1835) are both quite widespread species with their main distribution in South and Central-Europe (FRANCISCOLO, 1979). Since 1970, *H. cuspidatus* is expanding its distribution (DROST *et al.*, 1992; IVERSEN *et al.*, 2011; NIEUKERKEN, 1979). Also in Belgium, this species has increased considerably in the last two decades. *Graptodytes bilineatus* has known a very similar increase in Belgium.

VAN DORSSELAER (1957) mentions three records of *Hydrovatus cuspidatus* in Flanders and of *Graptodytes bilineatus* only two records of the same locality. Also in the following decades, only a few records exist until 2000, when both species increased drastically.

### Distribution and trend

The distribution of *Hydrovatus cuspidatus* and *Graptodytes bilineatus* is given in Fig. 1 (only Flanders was mapped because of the absence of the species in the Walloon region. There is, however, almost no recent data from the Walloon loamy region and thus the absence here could be a result of lack of data.). VAN DORSSELAER (1957) mentions three records of *H. cuspidatus* in Belgium and three for *G. bilineatus*. In the period from 1950 to 1980, there is only one record of *H. cuspidatus* and none of *G. bilineatus*. Between 1980 and 2000, there is a small increase with four known records of *H. cuspidatus* (see records in DENYS *et al.*, 2000) and *G. bilineatus* reappeared. From 2000 onwards, both species increased drastically. At present, *H. cuspidatus* is known from 31 sites in 27 10km squares and *G. bilineatus* from 38 sites in 27 10km squares. Both species have a very similar distribution in Belgium: being absent in the Walloon region (southern half of Belgium) and evenly distributed over low Belgium with an main cluster in the northwest of the province East-Flanders.

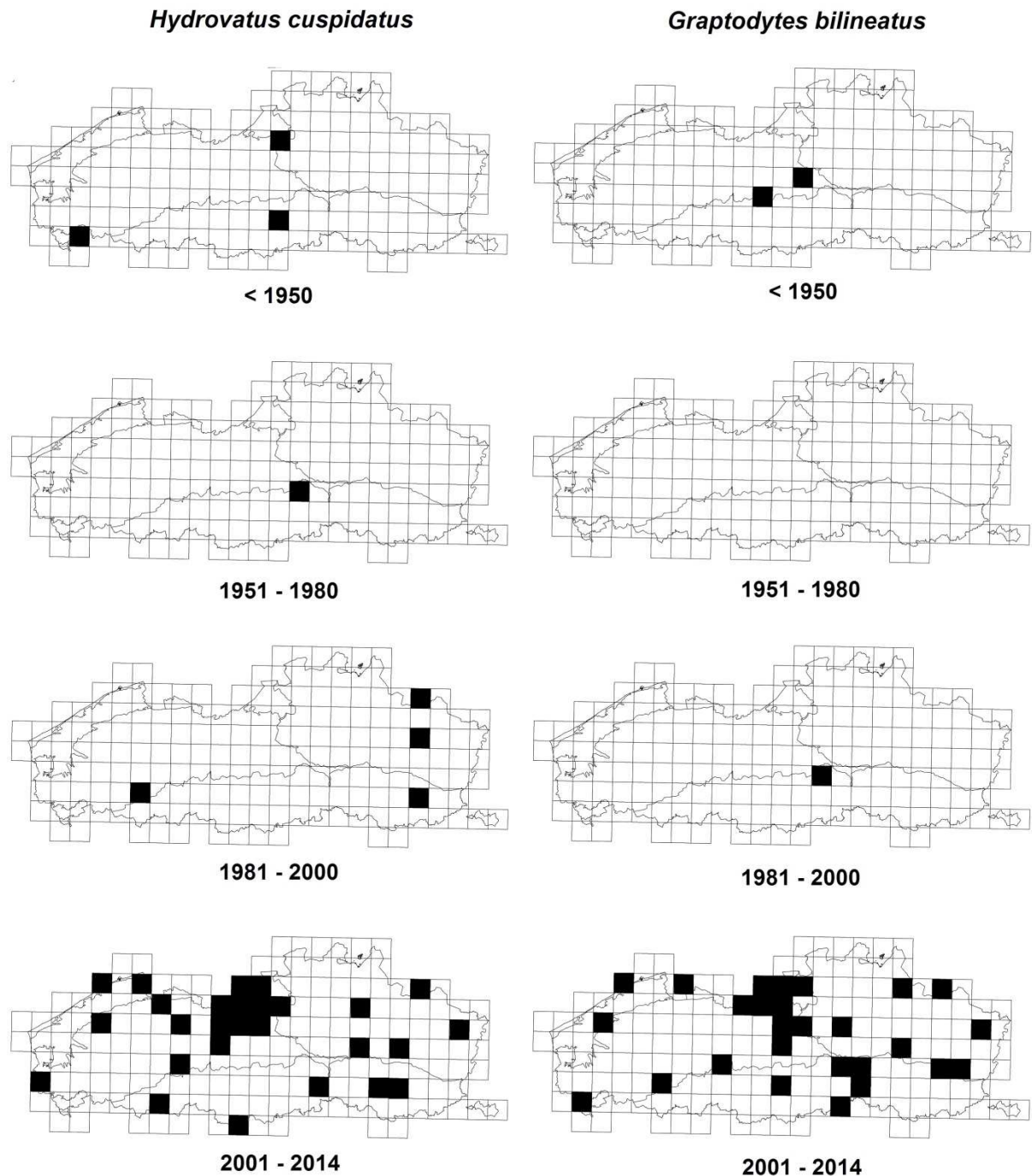


Fig. 1. Distribution maps of *Hydrovatus cuspidatus* and *Graptodytes bilineatus* in Flanders (northern half of Belgium) prior to 1950, 1951-1980, 1981-2000 and 2000-2014 (raster: 10km squares).

Also outside Belgium, there are reports of *G. bilineatus* increasing. In Ireland, this species was not encountered until 1986 (BILTON, 1988) and is now known from at least 12 10km squares (FOSTER *et al.*, 2009).

On the Flemish red list of 1992, *H. cuspidatus* was evaluated as critically endangered and *G. bilineatus* as 'rare' (BOSMANS, 1992). In the more recent provisional red list of 2012, the status of both species was lowered to vulnerable (SCHEERS, 2012). Both species occur on the German red list (GEISER, 1998), *G. bilineatus* is near threatened in Ireland (FOSTER *et al.*, 2009) and in Great Britain, both species are considered as nationally scarce (FOSTER, 2010).

## Habitat and phenology

*Hydrovatus cuspidatus* was found in different types of permanent, mesotrophic and eutrophic, stagnant water bodies. Two main habitats are preferred: 1) reedbeds with a more or less stable water level and 2) grassy edges of ponds and other water bodies with muddy substrate. This species is only present in open landscape. Three sites in the northwest of the province of East-Flanders where oligohalinen. In Belgium, this species has not yet been encountered in acidic water. FOSTER & FRIDAY (2011) mention that the species is associated with man-made habitats in Britain, usually in the extreme edge of thinly vegetated ditches and pools on exposed clay. This corresponds with the second habitat in Belgium described above.

In Belgium, *Graptodytes bilineatus* is associated with reedbeds and small mesotrophic fens with a dominance of *Drepanocladus aduncus* and influence of groundwater. In Ireland, FOSTER *et al.* (1992) mention its occurrence in a mountain lake as a member of the moss edge community. According to FOSTER & FRIDAY (2011), this species occurs in Great Britain mainly in reedbeds, sometimes in brackish water. In the Netherlands and Denmark, *G. bilineatus* is almost exclusively found the coastal regions (DROST *et al.*, 1992; NILSSON & HOLMEN, 1995).

*H. cuspidatus* is found from the beginning of March till the end of October, peaking in May and August. The species could not be found in winter at various sites where it is present in spring and summer. In Britain, the species has been found from April to September (FOSTER & FRIDAY, 2011).

*Graptodytes bilineatus* is to be found in Flanders year-round, peaking in winter when it can be found abundantly under the ice (personal observations). Also in Britain and Ireland, there are records throughout the year, but according to FOSTER & FRIDAY (2011) peaking in May and August.

## Discussion

The recent increase and distribution of *Hydrovatus cuspidatus* and *Graptodytes bilineatus* in Belgium are very similar. *H. cuspidatus* knows a comparable trend in The Netherlands, while *G. bilineatus* is still rare in The Netherlands with a limited distribution in the coastal region. As mentioned by NIEUKERKEN (1979), it is most likely that the increase of *H. cuspidatus* is linked with more suitable climatic conditions during the last decades. The similar increase of *G. bilineatus* in the same period and the coastal distribution in The Netherlands indicate that the trend seen in this species is also linked with climatic changes. In the next decades, this species will probably also increase in The Netherlands and Germany.

In Belgium, this increase is not seen in other southern Dytiscidae species. It is striking that, with the exception of these two species, especially northern species are recently experiencing a strong increase in Belgium (SCHEERS, 2014; SCHEERS, unpublished data). This recent increase of northern species is still to be investigated.

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