



## Distribution and phenology of the Belgian alderflies (Megaloptera)

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### Abstract

Three species of alderflies (Megaloptera) are present in Belgium: *Sialis fuliginosa* Pictet, 1836, *Sialis lutaria* (Linnaeus, 1758) and *Sialis nigripes* Pictet, 1865. The most common species is *S. lutaria*, which lives in stagnant waters and slow flowing watercourses. *S. fuliginosa* is less common since it mainly occurs in moderately fast running forest streams. *S. nigripes* is the rarest species, because it is restricted to large rivers such as the river Meuse, the river Ourthe and the river Amblève. No additional species are expected in Belgium.

**Keywords:** Belgium; checklist; *Sialis*.

### Samenvatting

In België komen drie soorten elzenvliegen (Megaloptera) voor: *Sialis fuliginosa* Pictet, 1836, *Sialis lutaria* (Linnaeus, 1758) en *Sialis nigripes* Pictet, 1865. De algemeenste soort is *S. lutaria*, die voorkomt in stilstaande wateren en traagstromende waterlopen. *S. fuliginosa* is minder algemeen omdat de soort vooral voorkomt in matig snel stromende bosbeken. *S. nigripes* is de zeldzaamste soort omdat deze soort enkel voorkomt in grote rivieren zoals de Maas, de Ourthe en de Amblève. Er worden geen bijkomende soorten verwacht in België.

### Résumé

Trois espèces de mégaloptères (Megaloptera) sont présentes en Belgique: *Sialis fuliginosa* Pictet, 1836, *Sialis lutaria* (Linnaeus, 1758) et *Sialis nigripes* Pictet, 1865. L'espèce la plus commune est *S. lutaria*, elle vit dans les eaux stagnantes et les cours d'eau lents. *S. fuliginosa* est moins commune parce que cette espèce préfère les ruisselets à eaux courantes dans les forêts. *S. nigripes* est l'espèce la plus rare, cette espèce étant limitée aux gros cours d'eau comme la Meuse, l'Ourthe et l'Amblève. Il n'y a pas d'autres espèces attendues pour la Belgique.

### Introduction

Alderflies or Megaloptera are insects with a complete metamorphosis. Adults are blackish brown, about 1.5 cm long and have two pairs of wings that are held like a roof over the abdomen. The membranous wings have very conspicuous nerves and the numerous costal veinlets give a ladder-like effect along the anterior edge of the wing. Adults have a clumsy flight and do not fly long distances from the water. It is therefore easy

to collect them with a net in the vegetation near the water. Alderflies are most active on warm, sunny days, especially during the morning. Although adults have biting mouthparts, there are no definite records indicating that they feed (ELLIOTT, 2009). The life of the adults is short, usually one week and rarely longer than two weeks. The female attracts the much smaller male by producing a scent and often a female is surrounded by several males, however, the female copulates only once. The eggs are laid in

clusters of hundreds on plants above or close to the water.

The first larval instars are essentially planktonic, the second instar descends to the bottom and burrows in the mud. The larval period lasts almost two years and there are about 10 larval instars, the first seven of which occur before the first hibernation. The shape of the body is elongately fusiform, typically broadest at the head and then slowly tapering towards the tip, where the abdomen terminates in a long, tapering hairy projection. The seven proximal segments bear laterally long, cylindrical, five-segmented tapering and hairy tracheobranchiae. Larvae have forwardly-projected mouthparts with powerful mandibles, which possess two strong teeth on the inner side. The night-active larva are predacious and with their strong mouthparts they feed on small invertebrates, mainly chironomid larvae and oligochaetes. The larvae leave the water in early spring when ripe for pupation. The larva digs into the soil close to the water and pupates there and later in spring, the adults emerge.

In the present study, all available collection material was studied and the Belgian literature was reviewed. The collected data were used to study the distribution and phenology of the three species occurring in Belgium.

### Materials and Methods

Most of the studied material belongs to the collections the Royal Belgian Institute for Natural Sciences, the Gembloux Agricultural University, the University of Liège and the University of Mons. In addition, Luc CRÈVECOEUR and the Werkgroep Invertebraten Denderstreek (WID) delivered some unidentified alderflies. Larvae as well as adults of all species of Megaloptera occurring in Belgium can be identified with the keys developed by MEINANDER (1996) or ELLIOTT (2009). The identification of adults requires study of the genitalia. Specimens are best be conserved in ethanol, since dried specimens are often difficult to identify because of the deformation after desiccation.

### Results

#### Literature overview

Three species of Megaloptera have been observed in Belgium (Table 1). Two species

Table 1. Checklist of the Belgian alderflies (Megaloptera).

#### ORDER MEGALOPTERA

##### Family Sialidae

- Sialis fuliginosa* Pictet 1836
- Sialis lutaria* (Linnaeus 1758)
- Sialis nigripes* Pictet 1865

were already reported in the nineteenth century: *Sialis fuliginosa* Pictet, 1836 and *Sialis lutaria* (Linnaeus, 1758) (MAC LACHLAN, 1881; DE SELYS-LONGCHAMPS, 1888). The third species, *Sialis nigripes* Pictet, 1865, was overlooked until STROOT (1986) discovered this species in the collection of the Royal Belgian Institute for Natural Sciences, where 71 specimens were present that were already captured in the nineteenth century.

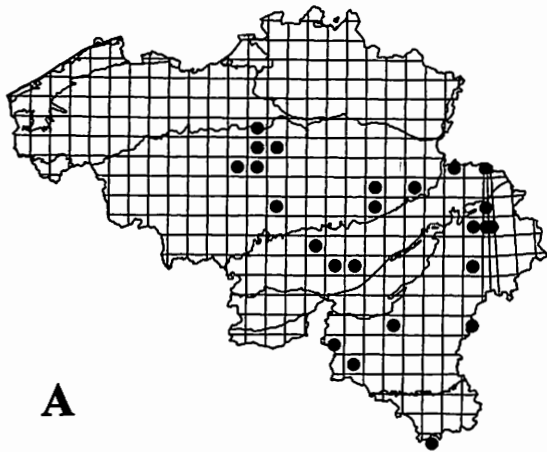
#### Recorded species

##### *Sialis fuliginosa* Pictet, 1836

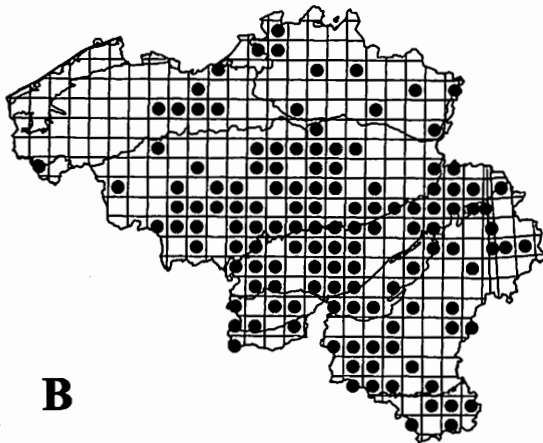
This species has been frequently reported in Belgium (MAC LACHLAN, 1881; DE SELYS-LONGCHAMPS, 1888; LAMEERE, 1900; NAVAS, 1909; VAN DER WEELE, 1910; NAVAS, 1912; STROOT, 1986; CORS *et al.*, 2004; DETHIER *et al.*, 2008). It lives in moderately fast streams and the upper reaches of rivers, especially in small forest streams. Since this type of streams are primarily found in the southern part of Belgium, the species was most frequently found in that region (Fig. 1A). Adults can be found from the start of May till the start of July (Fig. 2).

##### *Sialis lutaria* (Linnaeus 1758)

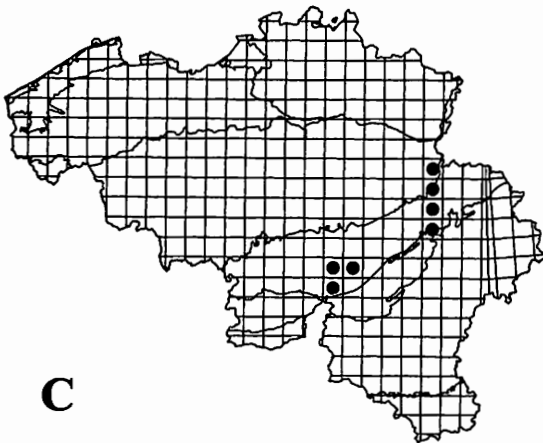
*Sialis lutaria* is the most common alderfly in Belgium and it has often been observed in Belgium (DE SELYS-LONGCHAMPS, 1888; LAMEERE, 1900; VAN DER WEELE, 1910; NAVAS, 1912, 1922; LESTAGE, 1920; MICHA, 1970; LITT, 1975, 1990; ROSILLON, 1983; STROOT, 1986; DOPAGNE & DETHIER, 2000; ROSE, 2000; DETHIER *et al.*, 2008). The species lives in stagnant waters and slow flowing watercourses and it has been found all over the country (Fig. 1B). Adults were found from March till July, however, the main activity period falls in May and June (Fig. 2).



A



B



C

Figure 1. Distribution of the Belgian Megaloptera: *Sialis fuliginosa* (A), *Sialis lutaria* (B) and *Sialis nigripes* (C).

#### *Sialis nigripes* Pictet 1865

After STROOT (1986) added this species to the Belgian fauna based on specimens that were already captured in the nineteenth century but that were not recognised as such. Afterwards, *Sialis nigripes* has only been reported by EVRARD & MICHA (1995). It is a species

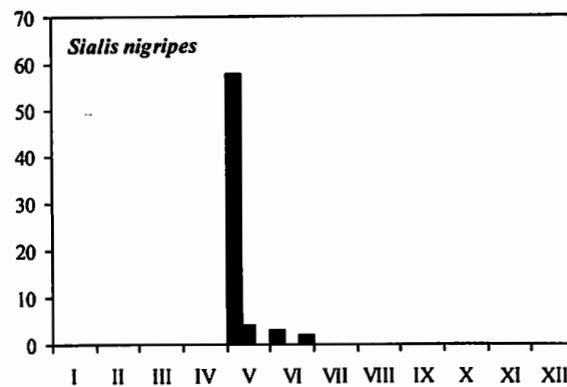
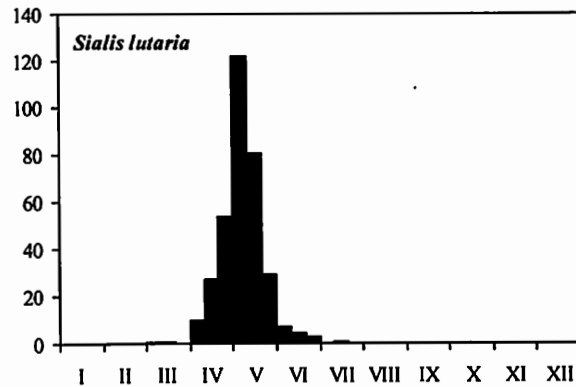
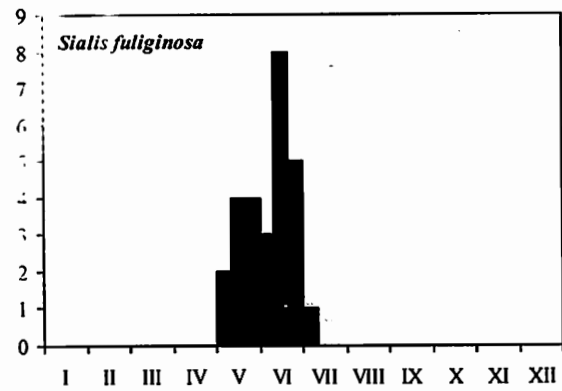


Figure 2. Phenology of the Belgian Megaloptera.

occurring in large rivers. In Belgium, it has only been captured along the river Meuse, the river Ourthe and the river Amblève (Fig. 1C). Adults can be found from the start of May till the end of June (Fig. 2). However, the shown phenology is somewhat distorted because most specimens were captured during a single capture at the start of May in Dinant.

#### Discussion

At least six species of Megaloptera are present in Europe, all belonging to the genus *Sialis* (ASPÖCK *et al.*, 1980). However, based on their distribution, no additional species are expected in Belgium. Since alderflies have not yet been studied systematically, the three species

occurring in Belgium are undoubtedly more widespread than indicated on the distribution maps (Fig. 1). Although the three species present in Belgium prefer different habitats, they can sometimes be found together.

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#### References

- ASPÖCK H., ASPÖCK U. & HÖLZEL H., 1980. - *Die Neuropteren Europas*. Goecke & Evers, Krefeld, Volume I, 495pp, Volume II, 355pp.
- CORS R., DETHIER M. & CUPPEN J., 2004. - Les invertébrés des eaux du Turon (commune de Theux). *Bulletin de la Société Royale Belge d'Entomologie*, 140 : 34-42.
- DE SELYS-LONGCHAMPS E., 1888. - Catalogue raisonné des Orthoptères et des Névroptères de Belgique. *Annales de la Société Entomologique de Belgique*, 32 : 103-203.
- DETHIER M., DOPAGNE C. & CUPPEN J., 2008. - Qualité biologique des ruisseaux du domaine universitaire du Sart-Tilman (Liège, Belgique) - Héteroïptères et Coléoptères aquatiques. *Faunistic Entomology - Entomologie faunistique*, 61 : 59-73.
- DOPAGNE C. & DETHIER M., 2000. - Insectes et mollusques aquatiques des étangs 'Les Cours' à Bolland (Pays de Herve, Belgique). *Natura Mosana*, 53 : 51-64.
- ELLIOTT J.M., 2009. - Freshwater Megaloptera and Neuroptera of Britain and Ireland. Keys to adults and larvae and a review of their ecology. *Freshwater Biological Association Scientific Publication*, 65 : 1-71.
- EVARD M. & MICHA J.-C., 1995. - Relation entre la diversité du substrat et la diversité faunistique dans un biot belge de la rivière Meuse. *Annales de Limnologie*, 31 : 93-103.
- LAMEERE A., 1900. - *Manuel de la faune de Belgique*. Tome 2. Bruxelles, 858 pp.
- LESTAGE J.A., 1920. - Le mécanisme de la ponte chez *Sialis lutaria* L. (Megaloptera). *Annales de Biologie Lacustre*, 10 : 221-223.
- LITT R., 1975. - Observations sur *Sialis lutaria* L. *Revue Vervétoise d'Histoire Naturelle*, 32 : 16-21.
- LITT R., 1990. - Observations sur l'accouplement de *Sialis lutaria* Linné (Névroptère/Mégaloptère). *Revue Vervétoise d'Histoire Naturelle*, 47 : 24-26.
- MAC LACHLAN R., 1881. - Trichoptères, Névroptères-Planipennes et Pseudo-Névroptères. *Annales de la Société Entomologique de Belgique*, 25 : CXXVI-CXXXIX.
- MICHA J.-C., 1970. - Etude qualitative des associations d'invertébrés de l'Ourthe Liégeoise. *Annales de la Société royale zoologique de Belgique*, 99 : 215-236.
- MEINANDER M., 1996. - *Megaloptera Sialidae, alder flies*. In : Aquatic insects of North Europe. A taxonomic handbook (Ed. NILSSON A.N.), Stenstrup, pp. 105-110.
- NAVAS L., 1909. - Nouvelles classes de Névroptères en Belgique. *Revue mensuelle de la Société Entomologique Namuroise*, 9 : 54-55.
- NAVAS L., 1912. - Synopsis des Névroptères de Belgique. *Revue mensuelle de la Société Entomologique Namuroise*, 13 : 36.
- NAVAS L., 1922. - Contribution à l'étude des Névroptères de Belgique. *Bulletin des Naturalistes de Mons et du Borinage*, 4 : 6-7.
- ROSE L., 2000. - Quelques notions sur les Névroptères (sensu lato) et les Mécoptères. *Revue Vervétoise d'Histoire Naturelle*, 57 : 115-127.
- ROSILLON D., 1983. - Etude quantitative de l'impact d'une pollution organique sur la biocénose benthique d'une rivière salmonicole: la Lhomme (Belgique). *Annales de la Société royale zoologique de Belgique*, 113 : 19-30.
- STROOT P., 1986. - Révision des Mégaloptères de la collection belge de l'I.R.S.N.B.- *Sialis nigripes* Ed. Pictet, 1865, Belg. n. sp. (Megaloptera, Sialidae). *Bulletin et Annales de la Société royale belge d'Entomologie*, 122 : 195-201.
- VAN DER WEELE, 1910. - Megaloptera. Collections Zoologiques du Baron Edm. de Selys-Longchamps. *Catalogue systématique et descriptif*, 5 : 1-93.