

## Additions to the checklist of Belgian Muscidae (Diptera) – genus *Coenosia* Meigen, 1826

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### Abstract

In this paper four species of the genus *Coenosia* Meigen, 1826 are added to the checklist of Belgian Muscidae: *Coenosia emiliae* Lukasjeva, 1986, *C. infantula* Rondani, 1866, *C. paludis* Tiensuu, 1939 and *C. pudorosa* Collin, 1953.

**Keywords:** Muscidae, *Coenosia*, new species for Belgium.

### Samenvatting

In dit manuscript voegen we vier soorten van het genus *Coenosia* Meigen, 1826 toe aan de Belgische Muscidae checklist: *Coenosia emiliae* Lukasjeva, 1986, *C. infantula* Rondani, 1866, *C. paludis* Tiensuu, 1939 en *C. pudorosa* Collin, 1953.

### Résumé

Quatre espèces du genre *Coenosia* Meigen, 1826 sont ajoutées à la liste des Muscidae de Belgique: *Coenosia emiliae* Lukasjeva, 1986, *C. infantula* Rondani, 1866, *C. paludis* Tiensuu, 1939 et *C. pudorosa* Collin, 1953.

### Introduction

Imagines of the genus *Coenosia* Meigen, 1826 are predaceous, just like other members of the subfamily Coenosiinae. They feed on other small, soft bodied insects and invertebrates (SKIDMORE, 1985; GREGOR *et al.*, 2002). Species of the genus *Coenosia* are being used increasingly as biocontrol agents in greenhouses, where adults of several species are effective predators of insect pests such as aphids, whiteflies, black fungus gnats, leaf-mining flies (KÜHNE, 2000; SEABRA *et al.*, 2015). However PONT (1993) has also observed some species of *Coenosia* feeding on nectar in northern Sweden. *Coenosia*-larvae are obligate carnivores and live in a wide range of different habitats (SKIDMORE, 1985; GREGOR *et al.*, 2002).

*Coenosia*-species are relatively small Muscidae, most of them measuring only a few millimetres in length. They are characterised by three katepisternal setae arranged in an inverted equilateral triangle, the absence of a prealar seta, usually only one pair of strong presutural dorsocentral setae (if two pairs, than anterior pair at most half as long as posterior pair) and a frons that is almost of the same width in both sexes and that bears one reclinate orbital seta on each side (GREGOR *et al.*, 2002).

The checklist of Belgian Muscidae by HOFMANS (1991) contains 21 species of *Coenosia* and three species of *Dexiopsis* Pokorny, 1893, which is now considered to be a synonym of *Coenosia*. In 2012 *Coenosia antennata* (Zetterstedt, 1849) was added to this list (MARTENS, 2012). In the present paper another four species are added: *C. emiliae* Lukasjeva, 1986, *C. infantula* Rondani, 1866, *C. paludis* Tiensuu, 1939 and *C. pudorosa* Collin, 1953.

## Material and methods

*Coenosia emiliae* was collected in a pitfall trap. The other species were obtained by sweeping vegetation with a net. Identification is based on GREGOR *et al.* (2002). The female *Coenosia emiliae* was also compared by Adrian Pont with females from the Czech Republic preserved in the Natural History Museum in London, U.K. All collected specimens are dry mounted and are preserved in the private collection of the author.

### Details of the observations, distribution and biological data

#### *Coenosia emiliae* Lukasjeva, 1986

MATERIAL. Viroinval, Bois de Treignes, pitfall trap 22.VI-7.VII.2012, 1♀, leg. R. Kekenbosch, det. & coll. C. Martens. Det. confirmed by Adrian Pont.

*Coenosia emiliae* is an extremely rare species. It is known only from the Caucasus and from a few localities in Central Europe (LUKASHEVA, 1986; PONT *et al.*, 2000; BARTÁK *et al.*, 2013; PONT, 2015). It was originally described from reared larvae and puparia found under the bark of several tree species in the Teberda reserve in the Caucasus Mountains of Russia and all the collection sites were situated between 1300 and 2000 m asl. (LUKASHEVA, 1986). Larvae and puparia of *Coenosia emiliae* were found to be most numerous under the bark of pine and fir, but also under the bark of oak, beech and birch. The majority of them were found in large sized trunks at a late stage of bark decomposition, in the brown moist rotten-wood layer. Probably the 3rd instar larvae or puparia overwinter. The earliest finds of larvae and puparia were made at the beginning of April. During May only puparia were found. The emergence of adults took place mainly from mid-May to mid-June. According to LUKASHEVA (1986) the larvae are probably zoophagous or zoonecrophagous.

Subsequently *Coenosia emiliae* was also found in Germany (Bebenhausen, Bad Balsee and Spiegelau), the Czech Republic (Macocho and Krkonoše Mountains) and Slovakia (Nová Sedlica). In Germany emergence traps placed above dead spruce and pan traps were used. In Slovakia the specimens were obtained by sweeping the undergrowth in deciduous and mixed forests and by sweeping over peat-bog meadow. All specimens in these countries were collected between the end of April and the first half of July. For some localities the altitudes are mentioned, egg. Spiegelau: 790 & 890 m; Macocha: 350 m (PONT *et al.*, 2000; BARTÁK *et al.*, 2013; PONT, 2015).

In Belgium I found one female specimen of *Coenosia emiliae* in samples from Bois de Treignes (Viroinval) that I received from Robert Kekenbosch (see map in Fig. 5). The specimen was collected in a pitfall trap during the period 22.VI-7.VII.2012, in a clearcut zone of a spruce forest at 285 m asl.

#### *Coenosia infantula* Rondani, 1866

MATERIAL. Aarlen, Camp Lagland, Marais du Landbruch, verges of dirt road, 14.V.2014, 1♀, leg., det. & coll. C. Martens; Philippeville, Etang de Roly, rough vegetation on banks of the lake, 1.IX.2014, 1♀, leg., det. & coll. C. Martens; Philippeville, Etang de Roly, dirt road, 1.IX.2014, 2♀, leg., det. & coll. C. Martens; Viroinval, Fondri des Chiens, lower border of calcareous grassland, 2.IX. 2014, 1♀, leg., det. & coll. C. Martens; Chimay, Lac de Virelles - Aquascope, 5.IX. 2014, 1♂ & 8♀, leg., det. & coll. C. Martens; Rochefort, Prelieu, calcareous grassland, 26.IX.2014, 1♀, leg., det. & coll. C. Martens.

*Coenosia infantula* occurs throughout Europe, from Ireland to Romania and Bulgaria and from Sweden to Italy (PONT, 2015). According to PONT (2015) the species has not yet been recorded in Belgium or the Netherlands, nor in France. Little information has been found about the ecological preferences of the species. In Germany *Coenosia infantula* has been found in grassy clearings and rather nutrient-poor grasslands, but also on ruderal terrain (DREES, 2007).

I found *Coenosia infantula* in very diverse habitats, both moist and dry. All records are situated in the “Fagne-Famenne-Calestienne” region and in the “Lorraine belge” (see Fig. 6). The earliest observation date is 14 May, the last observation date 26 September.



Fig. 1. Dirt road near 'Etang the Roly' (Philippeville), one of the sampling localities of *Coenosia infantula*.



Fig. 2. Dune pond in the nature reserve 'Zwinduinen en -polders' (Knokke-Heist), one of the sampling localities of *Coenosia paludis*.



Fig. 3. Salt meadow called 'Schorreweide' (Oudenburg), one of the sampling localities of *Coenosia paludis*.



Fig. 4. In the foreground 'Fagne de la Borne' (Saint-Hubert) and in the background 'Basseilles amont' (Saint-Ode), sampling localities of *Coenosia pudorosa*.

'Fondri des Chiens' and 'Preliu' are two calcareous grasslands in the "Calestienne". At 'Fondri des Chiens' the species was found at the lower border of the calcareous grassland, where the vegetation was more rough. 'Etang de Roly' is part of a chain of ponds located southwest of the village of Roly, in the Fagnes region. 'Lac de Virelles' is an old forge pond with humid forests and marshlands around the lake, located at the edge of the Fagnes region and the Calestienne. At 'Etang de Roly' the species was found in rough vegetation on the banks of the lake and along a dirt road near the lake (Fig. 1). At 'Lac de Virelles' the specimens were found in a meadow near the lake. 'Marais du Landbruch' is situated in the Lorraine belge. It is a bog in a valley with poor drainage. The bog is fed by two streams. Habitats that are hallmarks of this site are numerous: poor fens, transition mires and quaking bogs, rich fens, carr, active raised bogs, *Sphagnum Betula* woods, ... Nearby there are also interesting dry heathlands and several types of forest. *Coenosia infantula* was found here along a dirt road in the valley.

### ***Coenosia paludis* Tiensuu, 1939**

MATERIAL. Knokke-Heist, nature reserve Zwinduinen en -polders, Tobruk, dune pond, 2.VIII.2013, 1♂, leg., det. & coll. C. Martens; Oudenburg, Weiden Pompje, grazed salt meadow 'Schorreweide', 24.VIII.2014, 3♂, leg., det. & coll. C. Martens; Oudenburg, Weiden Pompje, grazed salt meadow north of 'Schorreweide', 24.VIII.2014, 2♂, leg., det. & coll. C. Martens; Jabbeke, Weiden Stalhille, nature reserve 'Schobbejak', meadow, 24.VIII.2014, 3♂, leg., det. & coll. C. Martens. All sites are managed by the Flemish Agency for Nature and Forests.

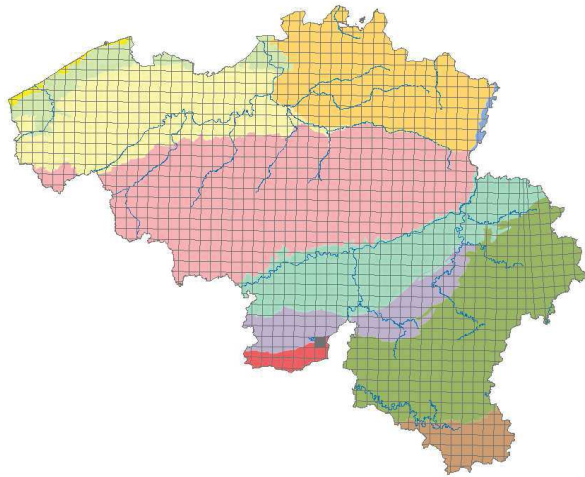


Fig. 5. Preliminary distribution map of *Coenosia emiliae*, using 5x5km UTM-squares.

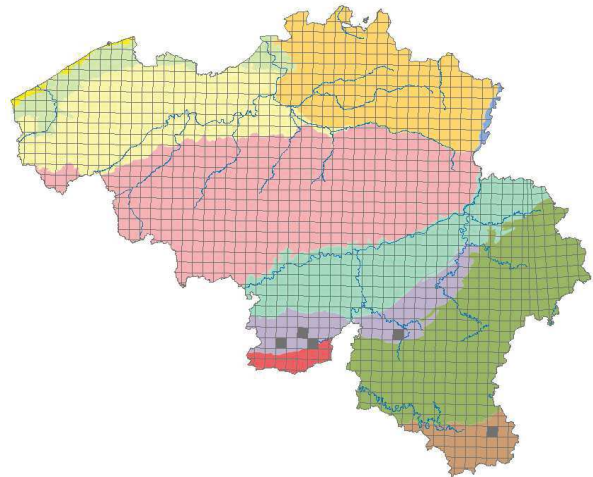


Fig. 6. Preliminary distribution map of *Coenosia infantula*, using 5x5 km UTM-squares.

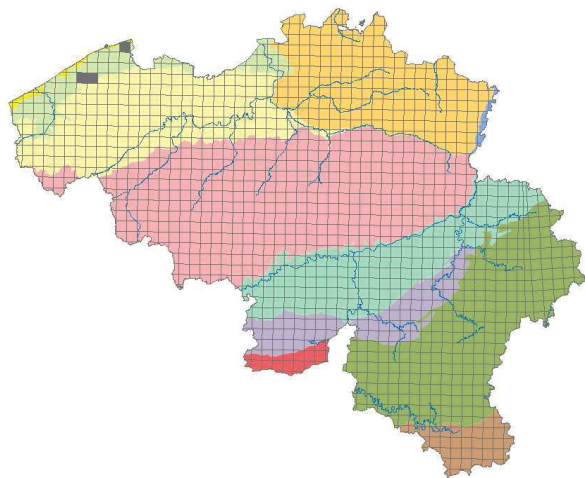


Fig. 7. Preliminary distribution map of *Coenosia paludis*, using 5x5 km UTM-squares.

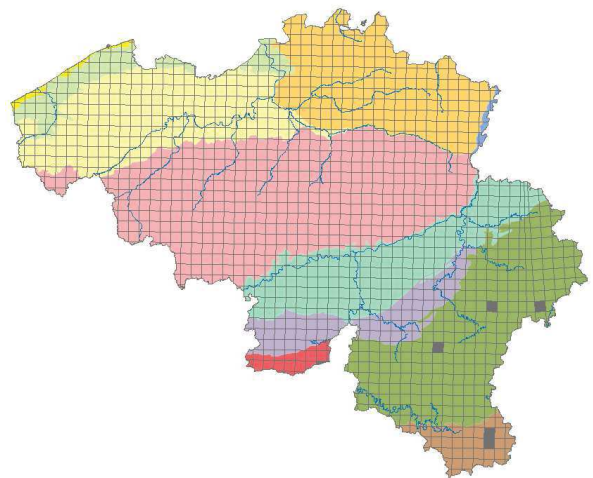
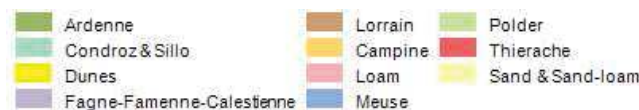


Fig. 8. Preliminary distribution map of *Coenosia pudorosa*, using 5x5 km UTM-squares.



According to GREGOR *et al.* (2002) and PONT (2015), *Coenosia paludis* occurs in Northern and Central Europe and in the UK. *Coenosia paludis* is certainly not restricted to coastal areas, and occurs e.g. in Austria and the Czech Republic, countries that have no coast. GEGOR & ROZKOŠNÝ (2009), for example, found the species in peat bogs in the Šumava mountains in the Czech Republic.

I found *Coenosia paludis* in coastal sand dunes and in the polders (see Fig. 7). All specimens were collected during the month of August.

The locality in the dunes is a recently restored pond in the nature reserve "Zwinduinen en -polders" (Fig. 2). The pond is a former sandpit. In the fall of 2008 it was cleaned of litter and the surrounding wood was cleared. The pond has abundant *Bolboschoenus maritimus s.l.* and some *Juncus gerardii* on the banks and a lot of *Ceratophyllum submersum* in the water. Nevertheless the habitat is not salty. These plant species probably come from the seed bank. The area is a former beach plain that was cut off from marine influence by an embankment in 1872 (ZWAENEPOEL *et al.*, 2007).

In the polder the species was found in two adjacent grazed salt meadows. The first one exists since a very long time and is managed by the Flemish Agency for Nature and Forests since the beginning of

the 1990's. It is called 'Schorreweide' (Fig. 3). In the second salt meadow the historical profiles were restored in 2008. The third locality in the polders is a meadow in the Nature Reserve Schobbejak. There are only a few limited halophilous elements, mainly in the edges of the parcel.

### ***Coenosia pudorosa* Collin, 1953**

MATERIAL. Martelange, Vallée de la Rulles, 20.VIII.2013, 3♀, leg., det. & coll. C. Martens; Aarlen, Camp Lagland, Marais du Landbruch, carr, 22.VIII.2013, 1♂, leg., det. & coll. C. Martens; Aarlen, Camp Lagland, Marais du Landbruch, bog, 22.VIII.2013, 1♂, leg., det. & coll. C. Martens; Aarlen, Camp Lagland, Marais du Landbruch, verges of dirt road, 22.VIII.2013, 1♂, leg., det. & coll. C. Martens; Aarlen, Camp Lagland, Marais du Landbruch, bog, 22.VIII.2013, 1♀, leg., det. & coll. C. Martens; Burg-Reuland, Hasselbach, small gullies forming the source of a brook, 16.VI.2014, 1♀, leg., det. & coll. C. Martens; Viroinval, Vallée d' Alise, dirt road, 04.IX.2014, 1♀, leg., det. & coll. C. Martens; Saint-Hubert, Fagne de la Borne, 29.IX.2014, 1♀, leg., det. & coll. C. Martens; Sainte-Ode, Basseilles amont, path, 29.IX.2014, 1♀, leg., det. & coll. C. Martens; Vielsalm, Fagne de Pisserotte, 01.X.2014, 1♀, leg., det. & coll. C. Martens.

According to GREGOR *et al.* (2002) and PONT (2015) *Coenosia pudorosa* occurs in Great Britain, Germany, Switzerland, the Czech Republic, Norway, Sweden, northwest Russia and Belarus. BARTÁK *et al.* (2004) found the species in spruce forest and in mixed forest in the Czech Republic.

I found the species in valleys with small brooks and in bogs & poor fens, in the Ardennes, the Thierache and the Lorraine (see Fig. 8). Figure 4 shows for example 'Fagne de la Borne' (Saint-Hubert) and in the background 'Basseilles amont' (Saint-Ode). All specimens were collected between 16 June and 1 October.

In most of the valleys with small brooks the flanks of the valleys are wooded while the bottoms are open and different habitat types alternate. Most specimens were collected in the open parts of the valleys, and were swept for example in tall herb fens, along dirt roads or in the border zone of bogs. One valley (Vallée d' Alise) was completely wooded up to the banks of the brook.

### **Discussion**

So far these four species have been recorded only a limited number of times, and they sometimes appear to be related to certain habitats and/or regions. However, more records are needed to confirm or contradict these trends.

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