
Ferrantia

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The Protura of Luxembourg

by

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The Protura of Luxembourg*

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Abstract

32 species of Protura are recorded from Luxembourg. Two of them are probably new and will be described elsewhere. 23 species are for the first time recorded from Luxembourg. The commonest species in the whole country are: *Acerentomon gallicum*, *A. affine*, *Eosentomon armatum*, *E. stompi*, *E. delicatum* and *E. bloszyki*. Common and numerous, but only in the northern part of the country are: *Acerentomon nemorale*, *Eosentomon silesiacum* and *E. funkei*. Some aspects of the ecology and distribution of the Luxembourgish species of Protura are discussed.

Résumé

32 espèces de Protoures sont signalées du Luxembourg. Deux sont probablement nouvelles pour la science et seront publiées ailleurs. 23 espèces sont signalées pour la première fois du Luxembourg. Les espèces les plus communes pour l'ensemble du pays sont: *Acerentomon gallicum*, *A. affine*, *Eosentomon armatum*, *E. stompi*, *E. delicatum* et *E. bloszyki*. Communes et nombreuses, mais limitées à la partie nord du pays sont: *Acerentomon nemorale*, *Eosentomon silesiacum* et *E. funkei*. Quelques aspects de l'écologie et de la répartition des espèces luxembourgeoises de Protoures sont discutés.

Zusammenfassung

32 Proturen-Arten werden aus Luxemburg nachgewiesen. Zwei sind wohl neu für die Wissenschaft und werden an anderem Ort beschrieben. 23 Arten werden zum ersten Mal aus Luxemburg gemeldet. Die häufigsten Arten über die gesamte Landesfläche sind: *Acerentomon gallicum*, *A. affine*, *Eosentomon armatum*, *E. stompi*, *E. delicatum* und *E. bloszyki*. Häufig und zahlreich, aber nur im Norden des Landes, sind: *Acerentomon nemorale*, *Eosentomon silesiacum* und *E. funkei*. Einige Aspekte der Ökologie und der Verbeitung der luxemburgischen Proturen-Arten werden diskutiert.

1 Introduction

The Protura described here were collected by Wanda M. Weiner of the Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences, Cracow, Poland and by Norbert Stomp (and his collaborators) of the National Museum of Natural History of Luxembourg. The field researches in Luxembourg were done

within the project "Étude des Collemboles et Protoures du Luxembourg" of the "Programme d'échanges dans le domaine des sciences, de la culture, de l'enseignement et de la jeunesse entre le Gouvernement de la République de Pologne et le Gouvernement du Grand-Duché de Luxembourg". The taxonomical studies were supported by the Polish Committee of Scientific

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In most of the European countries Protura still remain very poorly known - the older data are updated by Nosek (1973). From the adjacent countries - Germany, France, Belgium and the Netherlands 37, 33, 5 and 1 species are recorded respectively (Nosek 1973; Alberti & all. 1989, Condé & Szeptycki 1997; Ehrnsberger et al. 1997; Rusek 1988; Rusek & Stumpp 1989; Stumpp 1990; Stumpp & Szeptycki 1989; Szeptycki 1986, 1993, 1997a; Szeptycki & Weiner 1997). For the comparison - in the relatively good known Poland there are more than 60 species (Szeptycki 1997b) Till now only 7 species of Protura were recorded from Luxembourg (Szeptycki & Weiner, 1993, 1997; Szeptycki 2001). The present paper contains data about 32 species. Two of them are probably new to science (and will be described elsewhere), 23 are recorded for the first time from Luxembourg.

2 Material and Methods

Samples (202) were taken from 66 localities (fig. 1) in the years 1991 - 1999, mostly from April to August. Each sample contained litter, soil, mosses etc. of a volume about 1000 cm³. The material has been extracted by using the simple Tullgren funnels, preserved in 96% ethylic alcohol, and mounted as permanent slides in Marc André II liquid.

More than 4000 specimens of Protura were obtained, but part of them (about 600 specimens) remain undetermined. The determination of prelarvae of Acerentomidae is actually impossible. The same is true for most of the larvae I and some of the larvae II of the genus *Eosentomon*. Some specimens of the older instars of *Eosentomon* remain (because of the state of the preservation) undeterminable, too.

The material is preserved in the collections of the Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences, Cracow, and of National Museum of the Natural History of Luxembourg.

3 Check-List of the Luxembourg Protura

Hesperentomidae

Ionescuellum ulmiacum Rusek & Stumpp, 1989

Protentomidae

Proturentomon discretum Condé, 1961

Proturentomon minimum (Berlese, 1908)

Proturentomon sp. A

Protentomon barandiarani Condé, 1947

Acerentomidae s. l.

Acerentomon affine Bagnall, 1912

Acerentomon brevisetosum Condé, 1945

Acerentomon gallicum Ionescu, 1933

Acerentomon nemorale Womersley, 1927

Acerella remyi (Condé, 1944)

Acerentulus cunhai Condé, 1950

Acerentulus silvanus Szeptycki 1991

Acerentulus sp. A.

Najtentulus silvestris Szeptycki & Weiner, 1997

Gracilentulus europeus Szeptycki, 1993

Berberentulus polonicus Szeptycki, 1968

Eosentomidae

Eosentomon armatum Stach, 1927

Eosentomon bloszyki Szeptycki, 1985

Eosentomon delicatum Gisin, 1945

Eosentomon funkei Rusek, 1988

Eosentomon luxembourgense Szeptycki, 2001

Eosentomon mariae Szeptycki, 1986

Eosentomon pastorale Szeptycki, 2001

Eosentomon paucrum Szeptycki, 2001

Eosentomon sexsetosum Szeptycki, 1985

Eosentomon silesiacum Szeptycki, 1985

Eosentomon silvaticum Szeptycki, 1986

Eosentomon stachi Rusek, 1966

Eosentomon stompi Szeptycki & Weiner, 1993

Eosentomon umbrosum Szeptycki, 2001

Eosentomon vulgare Szeptycki, 1984

Eosentomon weinerae Szeptycki, 2001

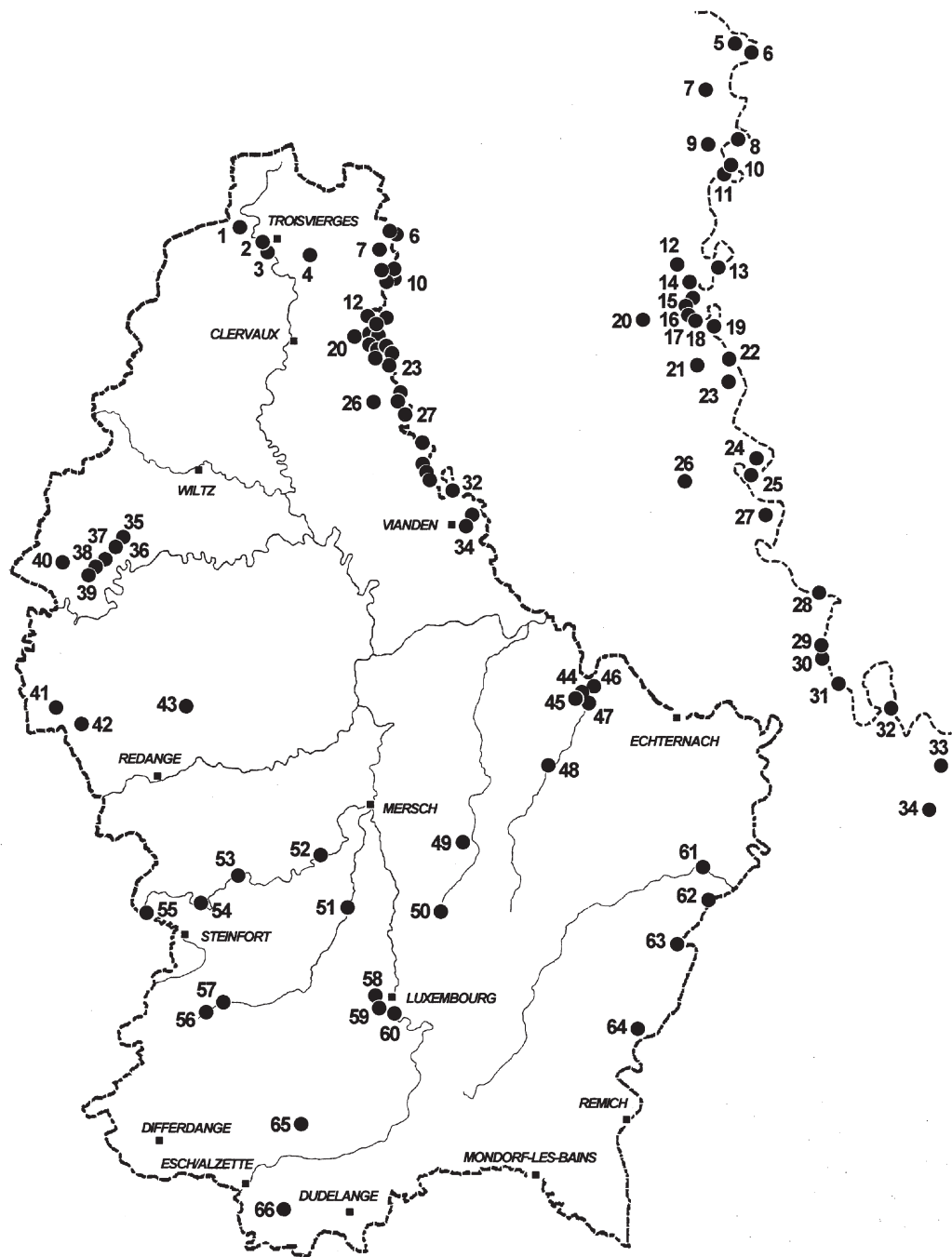


Fig. 1. Localities of the collecting of Protura

4 List of Samples

The material has been collected by the following persons: M. Cardew (abbreviated as MC), E. Carrières (EC), D. Dolisy (DD), N. Stomp (NS), M. Ursone (MU), W.M. Weiner (WW).

The names of the species collected in the individual samples are abbreviated as follows: *Acerella remyi* - *Ac.re.*, *Acerentomon affine* - *An.af.*, *A. brevisetosum* - *An.br.*, *A. gallicum* - *An.ga.*, *A. nemorale* - *An.ne.*, *Acerentulus cunhai* - *Al.cu.*, *A. silvanus* - *Al.si.*, *Acerentulus* sp. A - *Al.nv.*, *Acerentomidae* juvenes indeterminatae - *A.ind.*, *Berberentomus polonicus* - *Be.po.*, *Eosentomon armatum* - *E.ar.*, *E. bloszyki* - *E.bl.*, *E. delicatum* - *E.de.*, *E. funkei* - *E.fu.*, *E. luxembourgense* - *E.lx.*, *E. mariae* - *E.ma.*, *E. pastorale* - *E.pt.*, *E. paucrum* - *E.pa.*, *E. sexsetosum* - *E.sx.*, *E. silesiacum* - *E.ss.*, *E. silvaticum* - *E.sv.*, *E. stachi* - *E.st.*, *E. stompi* - *E.sm.*, *E. umbrosum* - *E.um.*, *E. vulgare* - *E.vu.*, *E. weinerae* - *E.wa.*, *Eosentomon indeterminatae* - *E.ind.*, *Gracilentulus europeus* - *Gr.eu.*, *Ionescuellum ulmiacum* - *Io.ul.*, *Najtentulus silvestris* - *Nt.si.*, *Protentomon barandiarani* - *Pt.ba.*, *Proturentomon discretum* - *Pr.di.*, *P. minimum* - *Pr.mi.*, *Proturentomon* sp. A - *Pr.nv.*

Loc. 1. Biwisch, Kircher Hecken, Forest, 5.05.1994. WW & NS.

(1). Mixed forest with beech, oak and birch. In ground cover *Vaccinium myrtillus*. (*An.ne.*, *E.ind.*).
(2). As 1, part of the forest with birch, maple and oak. In undergrowth young sorb, in ground cover grasses. (*An.ga.*, *An.ne.*, *E.ar.*, *E.ss.*, *E.sm.*).

(3). As 1, part of the forest with spruce, in undergrowth scattered young birches, in ground cover grasses and moss. (*E.ss.*).

Loc. 2. Troisvierges, 5 05.1994. WW & NS.

Tussocks of plants from a rock wall of southern exposition, covered with grasses, *Saxifraga*, *Stellaria*, etc. (*Gr.eu.*, *E.bl.*, *E.ss.*, *E.vu.*, *E.ind.*).

Loc. 3. Troisvierges, in the direction of Cinquefontaines, 5.05.1994. WW & NS.

(1). Humid grasses and mosses at foot of a shale rock near the road. (*An.ne.*).

(2). Mosses and lichens from a shale rock near the road (sample with ants). (*E.ss.*).

(3). Tussocks of grasses and soil between dwarf oaks - (*An.ne.*).

Loc. 4. Rossmillen (between Heinerscheid and Binsfeld), 5.05.1994. WW & NS.

(1). Grasses, moss and soil from shale rocks in a forest near the road. (*An.ne.*, *A.ind.*, *E.ar.*, *E.sm.*).

(2). Spruce forest. Needles and moss. (*An.ne.*, *E.ma.*, *E.ss.*).

(3). On the bank of Milleschlaed river, near the old mill. Mosses, grasses etc. under willows with *Polygonum bistorta*, *Vaccinium myrtillus*, etc. (*An.ne.*, *E.de.*).

Loc. 5. Lieler-Trois Frontières, slope of Our Valley in north-western exposition, 29.04.1991. WW & MU.

(1). Forest with oak and hazel, litter and mosses near trees. (*An.ga.*, *An.ne.*, *E.ss.*).

(2). Spruce forest, soil covered with moss and grasses. (*E.fu.*, *E.ma.*).

(3). Small forest with hazel, aspen, birch and elder; litter. (*An.ne.*, *E.ar.*, *E.sm.*).

Loc. 6. Our Valley south of Trois Frontières, 29.04.1991. WW & MU.

(1). About 10 m above the valley-floor, soil under *Prunus spinosa* with different herbs and mosses. (*An.ne.*, *E.sm.*).

(2). Meadow with *Anemone*, *Primula*, *Ficaria*, etc., mosses and tussocks of plants. (*E.ind.*).

(3). About 10 - 15 m above the valley-floor, shadow spruce forest. Thin layer of litter. (*An.ga.*, *E.ar.*, *E.fu.*, *E.ma.*, *E.ind.*).

(4). About 10 - 15 m above the valley-floor, beech forest with *Arum maculatum*, *Mercurialis perennis*, etc.; litter mixed with stones. (*An.ga.*, *An.ne.*, *E.ar.*, *E.ss.*, *E.ind.*).

Loc. 7. Our Valley near Heikapp.

(1). 29.04.1991. About 80 m above the valley-floor, slope of south-eastern exposition. Very compact soil with mosses and spruce needles. WW & MU. (*An.ne.*).

(2). About 100 m above the valley-floor, slope of south-eastern exposition. Oak forest, tussocks of grasses, moss, litter. (*An.ga.*, *An.ne.*, *E.fu.*, *E.ma.*, *E.ss.*, *E.ind.*).

(3). 5. 07. 1991. Near Obereisenbach, between Husterbaach and Our, slope of north-eastern exposition. Humid beech forest on shale rocks, grasses, mosses, *Oxalis*. MU. (*Pr.mi.*, *E.de.*).

Loc. 8. Kalbermillen, 21.07.1991. MU.

Near the river, insolated meadow with young Douglas spruces. (*E.bl.*, *E.ind.*).

Loc. 9. Kalborn, in the direction of Kalbermillen, 21.07.1991. MU.

(1). Sandy, dry locality of south-eastern exposition covered with oaks and grasses. Litter with moss. (*E.de.*, *E.ma.*, *E.st.*, *E.ind.*).

(2). Moss from the stones in the river. (*An.ne.*, *E.ma.*, *E.fu.*, *E.ind.*).

(3). Near the bank of river Our - shale rocks covered with *Cytisus* and moss on south-eastern slope. (*E.ind.*)

Loc. 10. Our Valley, in the direction of Tintesmillen, 29. 04. 1991. WW & MU.

(1). Slope of eastern exposition about 50 m above the valley-floor, small gorge with a river, spruce forest. Mosses from the bank of a river. (*An.ga.*, *An.ne.*).

(2). Plant and mosses from the bank of river Our. (*An.ga.*).

(3). About 50 m above the valley-floor, litter with mosses and soil on a rock, between the roots of *Erica*, (*An.ne.*, *E.sm.*).

Loc. 11. Tintesmillen, 21. 07. 1991. MU.

(1). Litter under oaks and beeches. (*An.af.*, *An.ga.*, *An.ne.*, *A.ind.*, *E.ar.*, *E.bl.*, *E.de.*, *E.pa.*, *E.ind.*).

(2). Small bushes with grasses and moss on insolated slope of north-eastern exposition. Litter with needles. (*E.ss.*, *E.ind.*).

(3). Deciduous forest with the oak undergrowth, with ferns, mosses, *Oxalis* etc. Litter. (*An.br.*, *An.ga.*, *An.ne.*, *E.ar.*, *E.de.*, *E.pa.*, *E.ind.*).

(4). Humid locality - maple-trees, beech, elder,

oak, ferns. Litter with moss. (*An.ne.*, *E.ar.*, *E.ss.*).

(5). Near the bank of the river. (*E.ind.*).

Loc. 12. Between Fischbach, Kasselberg and Stroumbaach, 21.07.1991. MU.

Near a road along Stroumbaach, south-eastern exposition - litter etc. under beeches, Douglas spruces and *Cytisus*. (*An.ga.*, *An.ne.*).

Loc. 13. Near Kasselberg, 21.07.1991. MU.

(1). Between Kasselberg and Zogel, near Stroumbaach River, coniferous forest, soil with needles. (*An.ne.*, *E.fu.*, *E.ind.*).

(2). Above Kasselberg, glade in a coniferous forest, litter under dog roses. (*E.ma.*, *E.ss.*, *E.ind.*).

Loc. 14. Between Stroumbaach and Kasselberg, 21 07.1991. MU.

A road along the river Our - litter etc. under oaks on shale rocks of south-eastern exposition. (*E.fu.*, *E.ma.*, *E.ind.*).

Loc. 15. Kasselberg, on the bank of river Our, 21.07.1991. MU.

(1). North-eastern exposition - humid soil under grasses. (*E.ar.*, *E.ind.*).

(2). In the direction of Zogel, litter with moss under beeches. (*E.ar.*, *E.sm.*, *E.ind.*).

Loc. 16. Kënzelbaach, 5.07.1991. MU.

Very wet place on shale rocks. (*An.ga.*).

Loc. 17. Ruederbaach, 5.07.1991. MU.

Litter etc. under oaks and Douglas spruces. (*An.af.*, *An.ga.*, *An.ne.*, *E.ar.*, *E.de.*, *E.ss.*, *E.ind.*).

Loc. 18. Wouschbech, 5.07.1991. MU.

(1). Slope of south-western exposition - litter with grasses under beeches and oaks. (*An.ne.*, *E.ar.*, *E.fu.*, *E.ma.*, *E.ss.*, *E.ind.*).

(2). Near the river, north-western exposition, locality very wet. Grasses, soil and mud. (*E.ar.*, *E.ind.*).

(3). Near Rellesmühle, north-western exposition. Shadowed locality, Douglas spruce forest. Moss and needles. (*Nt.si.*, *Gr.eu.*, *E.ar.*, *E.sm.*).

Loc. 19. Rellesmülle, 5.07.1991. MU.

Near the river - soil, plant debris etc. under overgrowth of nettles. (*E.de.*).

Loc. 20. Between Roder and Our Valley, 21.07.1991. MU.

(1). On the border of a road, northern exposition - moss under oaks. (*E.ar., E.ss., E.sm., E.vu., E.ind.*).

(2). As 1., litter with needles under Douglas spruce. (*E.ar., E.fu., E.ma., E.sx., E.st., E.sm., E.vu., E.ind.*).

(3). As 1., insolated locality of eastern exposition, near a field of ryegrass with cornflowers, grasses, clover, dandelion, etc.; dry soil. (*E.ar.*).

(4). Between Kënzelbaach and Ruederbaach. Small glade in a forest near a small brook - nettles, *Digitalis*, thistles, mullein etc.; soil. (*E.ar., E.ind.*).

(5). Mosses from the trunk of a beech in a mixed forest in shadowed, humid locality of north eastern exposition. (*An.af., An.ne., E.ma., E.ss., E.ind.*).

(6). The bank of river Ruederbaach, soil with needles etc. from Douglas spruce forest on shale rocks. (*An.ga., E.ar., E.ind.*).

(7). Litter and moss from beech forest on slope of north-western exposition. (*An.ga., An.ne., A.ind., E.fu., E.ind.*).

Loc. 21. Elscenterbaach, about 100 m above the valley-floor, 5.07.1991. MU.

(1). Litter and mosses under ferns. (*An.ne., E.ar., E.ind.*).

(2). Litter and mosses under Douglas spruce with ferns. (*An.ne.*).

Loc. 22. Our Valley near Zollamt, about 200 m above the valley-floor, 5.07.1991. MU.

Soil, litter etc. under oaks and beeches with *Oxalis* in shadowed locality. (*An.af., An.ne., E.ar., E.ind.*).

Loc. 23. Roderhausen, Traesbech, 5.07.1991. MU.

(*An.ga., E.ar., E.bl., E.de., E.fu., E.ss., E.sm., E.ind.*).

Loc. 24. Between Kohnenhof and Schmitzdelt, 5.07.1991. M.

Litter, grasses etc. from the border of beech - oak forest. (*An.ne.*).

Loc. 25. Kohmenhof, on river Our, 5.07.1991. MU.

Insolated locality of northern exposition near a forest: beech, *Echium vulgare*, *Chrysanthemum*, nettles, etc. (*E.de., E.ind.*).

Loc. 26. The road between Oberreisendorf and Clervaux, Holzbichsbaach Valley, 11.04.1991. WW & MU.

Forest with spruce, oaks, elder (in the ground cover grasses and *Ficaria*) near a small river. Litter with grasses and mosses. (*An.af., An.ga., E.ar., E.ind.*).

Loc. 27. Obereisenbach, 5.07.1991. MU.

(1). Near a road, humid, shadowed locality of north-eastern exposition. Litter etc. under Douglas spruces with ferns. (*An.af.*).

(2). Near Husterbaach, slope of northern exposition. Litter and mosses under oaks. (*An.af., An.ga., An.ne., E.ma., E.ind.*).

(3). As 2., near a river, very wet place. Oaks, beech, *Geranium*, blackberry etc. Litter. (*An.af., An.ga., An.ne., E.ar., E.sm., E.ind.*).

(4). As 2., beeches, in undergrowth nettles, *Geranium*, *Digitalis* etc. (*An.ne., E.ar., E.sm., E.ind.*).

(5). Husterbaach, about 30 m above the valley -floor, humid, shadowed locality of northern exposition. Mosses under oaks with *Oxalis*, ferns etc. (*An.af., An.ga., An.ne., E.ar., E.ma. E.ss., E.ind.*).

(6). As 5., about 200 m above the valley floor, uncovered locality of northern exposition - thistles, cornflowers, *Viola* sp. etc. (*An.ga., Ac.re., E.ma., E.sm., E.ind.*).

(7). As 5., about 200 m above the valley floor, pasture(?) - grasses, moss, *Myosotis* sp. (*An.br., An.ga., E.fu., E.ma., E.ss., E.sm., E.ind.*).

Loc. 28. Gemünd, below Akeschterbaach, 11.04.1991. WW & MU.

Spruces on acid soil on the slope with eastern exposition. Litter with spruce needles. (*An.ga., Ac.re., E.ma.*).

Loc. 29. Near the road between Klangbaach and Akeschterbaach, 11.04.1991. WW & MU.

(1). Forest with beech, oak, hazel, blackberries,

Oxalis, *Lamium* etc. on slope with southern exposition, about 350 m. Litter and mosses. (*An.ne.*, *E.sv.*, *A.ind.*).

(2). As 1, on slope with northern exposition. Litter and mosses. (*An.ne.*, *E.sm.*).

(3). Slope with southern exposition, above the rocks, about 300 m. Bushes with *Cytisus*, dwarf oak etc. Soil and litter between the roots of *Cytisus*. (*A.ne.*, *E.fu.*).

Loc. 30. Stolzembourg, the road in the direction of Klangbaach and Akeschterbaach, about 420 m, 11.04.1991. WW & MU.

(1). Field forest with beech, oak, cherry-tree, blackberries and ferns, litter with mosses. (*An.ne.*, *A.ind.*, *E.ar.*, *E.ind.*).

(2). As 1., soil and plant-debris. (*An.ne.*, *E.ar.*, *E.de.*, *E.pa.*, *E.sm.*, *E.ind.*).

Loc. 31. Stolzembourg, rocks at river Our, eastern slope, 11.04.1991. WW & MU.

(1). Forest with willows, elder, hazel, oak and beech, grasses and ferns. Humid soil, litter and mosses. (*E.ss.*, *E.ind.*).

(2). Mosses and tussocks of plants from rocks. (*E.ind.*).

Loc. 32. Near Bivels, 11 04.1991. WW & MU.

Eastern, sunny slope, tussocks of plants (*Saxifraga*), mosses and soil from shale rocks. (*E.ar.*, *E.bl.*, *E.fu.*, *E.ss.*, *E.st.*, *E.ind.*).

Loc. 33. North of Vianden, a small valley east of the main valley. 11.04.1991. WW & MU.

(1). Deciduous forest (mostly oaks and elder). Humid soil, litter. mosses. (*An.af.*).

(2). Deciduous forest (mostly oaks and elder) with *Anemone*, *Lamium*, *Rubus* etc. on slope with north-western exposition. Thin layer of litter, mosses. (*An.ne.*, *A.ind.*, *E.ss.*).

(3). Small rocky crest (shale) of south-western exposition. Humid litter between tussocks of mosses, soil, and decaying leaves. (*Ac.ne.*, *E.ss.*).

Loc. 34. Vianden, above the city center, 24.04.1991. WW & NS.

(1). At foot of a rock with a small watercourse,

rock covered with *Sedum*, blackberries etc. Litter. (sample with ants). (*An.ga.*).

(2). Tussocks of petrophilous plants with *Sedum* and mosses. (*An.af.*, *An.ne.*, *E.ar.*, *E.fu.*, *E.ind.*).

(3). Litter under *Prunus spinosa* (sample with ants). (*E.ind.*).

Loc. 35. Bavigne, 17.06.1995. WW & NS.

(1). Old meadow with *Veronica officinalis*. (*E.st.*, *E.sm.*, *E.ind.*).

(2). Old meadow with grasses and *Lathyrus vernus*, deep layer of mosses. (*E.sm.*).

(3). Old "thermophilous" meadow with *Galium verum*. (*E.ar.*, *E.bl.*, *E.de.*, *E.ind.*).

(4). Former hay-growing meadow actually plowed and sowed. (*E.sm.*).

Loc. 36. Between Baschleiden and Bavigne. WW & NS.

(1). 24. 04. 1993. Oak forest with *Convallaria* on isolated slope of south-eastern exposition. (*An.ne.*, *E.fu.*, *E.ss.*).

(2). The crest above the barrier lake (in front of Bourfelt farm), soil from a nearly horizontal rock of southern exposition. (*An.ne.*, *E.ss.*).

(3). As 2. - oak forest on the slope of eastern exposition, soil. (*An.ne.*, *A.ind.*, *E.de.*, *E.fu.*).

(4). 9.05.1993. Simons Berg, oak forest with hazel on the slope of southern exposition, in the ground cover *Anemone*, *Convallaria*, grasses. (*An.af.*, *An.br.*, *An.ne.*, *E.de.*).

(5). Simons Berg, artificial spruce forest, in the ground cover only mosses. 9.05.1993. (*An.ga.*, *Ac.re.*, *E.ar.*, *E.ss.*).

(6). Simons Berg, old timber storage, mostly needles accumulated between the trunks. 9.05.1993. (*An.br.*, *E.ss.*, *E.vu.*).

(7). Near a brook (near to a spring) - spruces and hazel on slope of southern exposition, in ground cover *Chrysosplenium alternifolium*, *Anemone*, mosses. 9. 05. 1993. (*Ac.re.*).

(8). Near a small pond in the forest - shadow place with spruces, in ground cover mosses, *Anemone* etc. (*An.af.*, *An.ne.*, *E.ind.*).

(9). Old meadow (pasture) with *Colchicum*, *Pulmonaria montana*, *Veronica officinalis*, *Agrimonia*, *Primula*, etc., grasses and moss. 9.05.1993. (*Ac.re.*,

E.bl., *E.sm.*).

(10). Nearer to Baschleiden, floor of the valley of Frankendelt River, meadow with *Stellaria*, sorrel, grasses and numerous mosses. 9.05.1993. (*Ac.re.*, *E.bl.*).

(11). As 10, bank of a river, under nettles and *Filipendula ulmaria*, decaying grasses. 9. 05. 1993. (*Ac.cu.*, *E.sm.*).

Loc. 37. Baschleiden-Langescht. WW & NS.

(1). 24.04.1993. Decaying grasses etc. from oak forest. (*An.ne.*, *A.ind.*, *E.ar.*, *E.sm.*, *E.ind.*).

(2). Crest in the direction of the valley of Bech and Frankendelt, northern slope with *Vaccinium*, sample with moss. (*An.ne.*).

(3). As 2. - soil. (*An.ne.*, *A.ind.*, *E.ar.*, *E.fu.*, *E.ss.*, *E.sm.*).

(4). 2.05.1993. Near a spring, forest with *Viburnum opulus*. (*An.ne.*, *Ac.re.*, *A.ind.*, *E.sm.*).

(5). As 4.- southern slope near the river Bech. (*An.ne.*, *Ac.re.*, *A.ind.*, *E.ar.*).

(6). As 4. - abandoned track to the river Bech, southern slope, mosses. (*Ac.re.*, *E.sm.*).

(7). As 4. - norther slope, decaying timber with mosses. (*E.de.*, *E.sm.*).

(8). Former swamp Paderbourn, near a spring, very wet locality. (*An.af.*, *An.ne.*, *E.bl.*, *E.sm.*, *E.ind.*).

(9). Near Haemicht, beech forest on the northern slope. (*An.af.*, *An.ne.*, *E.ar.*, *E.sm.*, *E.ind.*).

(10). Fresh meadow (former pasture) with *Colchicum*, *Primula*, *Pulmonaria*, *Centaurea montana*, willow-herb and mosses, soil and plant-debris. (*Pt.ba.*, *Ac.re.*, *A.ind.*, *E.de.*, *E.wa.*, *E.ind.*).

(11). 10.06.1995., as 8. - (*Ac.re.*, *E.ar.*, *E.sm.*, *E.we.*, *E.ind.*).

(12). 19 06.1999., as 8. - (*Ac.re.*, *E.ar.*, *E.bl.*, *E.de.*, *E.pt.*, *E.sm.*, *E.ind.*).

(13). 10.06.1995. Former hay-growing meadow near the river Bech, southern slope with *Centaurea jacea*, *C. scabiosa*, *Knautia arvensis*, *Primula elatior*, etc., some mosses. (*E.we.*).

(14). Meadow on norther slope with *Phyteuma spicatum*, *Centaurea montana*, *Lathyrus vernus*, etc. (*E.sm.*, *E.ind.*).

(15). Beech forest on southern slope, near a periodic spring. (*E.ar.*, *E.ind.*).

(16). Small heath with *Galium anisophyllum*, *Calluna vulgaris*, *Cytisus scoparius* etc. and grasses. (*E.sm.*, *E.ind.*).

Loc. 38. Baschleiden, 5.10.1991. WW & NS.

(1). Deciduous forest with oak and hazel. Litter and soil. (*An.ne.*, *E.ar.*, *E.fu.*, *E.ss.*, *E.ind.*).

(2). Deciduous forest, litter between the roots of the oak about 250 years old. (*An.ne.*).

(3). Cold pasture with *Colchicum*. Moss and grasses. (*Ac.re.*, *E.sm.*).

Loc. 39. Baschleiden, 24.04.1994. WW & NS.

Decaying branches and soil with moss near the wall of a garden, under elder and ash. (*E.ar.*).

Loc. 40. Between Baschleiden and Surré, am Sierberberg. WW & NS.

(1). 16.05.1993. Moss from the border of a pasture. (*E.bl.*).

(2). Old meadow (pasture) with numerous *Veronica*, between small shrubs of *Prunus*, grasses, moss. (*E.bl.*, *E.de.*, *E.sm.*, *E.ind.*).

(3). Meadow - locality with *Polygonum bistorta*. (*E.ar.*, *E.sm.*, *E.we.*).

(4). Humid meadow with *Caltha*, *Myosotis palustris*, *Dactylorhiza majalis* etc. (*E.bl.*).

(5). 25.06.1995. Surré, beech forest with scattered young beeches in the undergrowth, litter. (*An.ne.*).

(6). Surré, border of a ditch, near spruce forest (about 40 years old), grasses, *Digitalis*, *Myosotis*, buttercup, nettles, raspberries etc., mosses. (*An.ne.*, *E.ar.*, *E.bl.*, *E.ss.*, *E.sm.*).

(7). Surré, at bank of a small river - oaks, hornbeam, spruce near the border of a pasture, litter between the roots of an oak. (*An.ne.*).

(8). Surré, hazel overgrowth, litter under hazel. (*An.af.*, *An.ne.*, *E.ar.*, *E.ind.*).

(9). Surré, fresh glade in a spruce forest with *Lychnis flos-cuculi*, mosses, buttercup, *Lysimachia punctata* etc. (*E.ar.*, *E.bl.*, *E.sm.*).

Loc. 41. Nothomb Baach, Holtz, Attert Valley, 28.06.1995. DD.

Oak-beech forest. (*E.ar.*, *E.ind.*).

Loc. 42. Riederbaach, above Roodt, Attert Valley, 28.06.1995. DD.

Oak-beech forest. (*An.af.*, *E.ar.*, *E.sm.*, *E.ind.*).

Loc. 43. Breschterbaach, Horace, Attert Valley, 29.05.1995. DD.

Forest with ash and beech. (*An.ga.*, *A.ind.*, *E.fu.*, *E.ss.*, *E.ind.*).

Loc. 44. Vogelsmühle, left bank of the Hallerbach River, 18.06.1997. WW & NS.

Hay-growing meadow along the river, soil under nettles. (*E.ind.*).

Loc. 45. Vogelsmühle, Hallerbach River. WW & NS.

(1). 18.06.1997. Soil with sand under beeches, ashes and hornbeams. (*E.ind.*).

(2). As 1., 2.07.1998. (*Ac.re.*, *Al.cu.*, *E.ar.*, *E.sm.*, *E.ind.*).

(3). 18.06.1997. Slope over the Hallerbach River (10 m far of the water), under beeches and oaks. Litter and soil near decaying branches. (*An.af.*, *An.br.*, *An.ga.*, *Ac.re.*, *Al.cu.*, *E.ar.*, *E.sv.*, *E.sm.*, *E.ind.*).

Loc. 46. Berdorf, Zigzagschloeff - sandstone rocks near a campsite, 17.04.1991. WW & MU.

(1). Forest with beech, oak and pine. Litter in small gorge between two rocks (mostly leaves of beech). (*E.ss.*).

(2). As 1., mosses from rocks. (*E.sv.*).

Loc. 47. Berdorf, Schnellert Forest. EC & MC.

(1). Litter at foot of rocky wall. 17.07.1998. (*E.sv.*, *E.vu.*, *E.ind.*).

(2). As 1. - 09.11.1998. (*E.vu.*).

(3). Litter from a rock fissure. 17.07.1998. (*An.br.*, *An.ga.*, *E.ar.*, *E.sv.*, *E.ind.*).

(4). As 3. - 09.11.1998. (*An.ga.*, *E.ar.*, *E.sv.*, *E.ind.*).

(5). Litter under Ilex, between dead beech and a rock wall. 17.07.1998. (*An.af.*, *An.br.*, *An.ga.*, *E.ar.*, *E.sm.*, *E.ind.*).

(6). As 5. - 09.11.1998. (*An.af.*, *E.ar.*, *E.ind.*).

Loc. 48. Near the road crossing Christnach-Breidweiler and Blumenthal-Mullerthal. WW & NS.

(1). 18.06.1997. Bank of Ernzt Noire, eastern slope, beech forest with periwinkle and *Asperula odorata*, soil with roots. (*An.ga.*, *E.ar.*, *E.de.*, *E.sv.*, *E.sm.*, *E.ind.*).

(2). As 1., at foot of rocks, litter with a large amount of decaying leaves. (*An.af.*, *An.ga.*, *Ac.re.*, *E.ar.*, *E.sv.*, *E.sm.*, *E.ind.*).

(3). As 1., soil, moss and lichens from sandstone rocks. 18. 06. 1997. (*Ac.re.*).

(4). 2. 07. 1998. Valley of Ernzt Noire. Forest with beech and ash, alluvial soil covered with periwinkle. (*Ac.re.*, *E.ind.*).

Loc. 49. East of Altlinster-Groeknapp, nature reserve with *Mesobrometum*, 18.06.1997. WW & NS.

(1). Southern slope (marl), soil and cattle dung. (*E.bl.*, *E.de.*).

(2). Mosses, grasses and soil under junipers and dog roses. (*E.bl.*, *E.ind.*).

Loc. 50. Grünewald, eastern slope of Ernzt Blanche, 18.06.1997.

(1). Beech forest, in undergrowth mostly young beeches, in ground cover mostly *Asperula odorata*. (*E.fu.*).

(2). Beech forest - part with many old trees, in ground cover mostly *Asperula odorata*, litter near an old beech. (*E.fu.*, *E.sm.*).

(3). As 2. - litter near an old spruce. (*E.fu.*, *E.sv.*).

Loc. 51. Direndall (Kopstal), 24.04.1991. WW & NS.

(1). A spring near the road, calcified mosses at the bank of a river. (*An.af.*, *An.ga.*, *A.ind.*, *E.ma.*, *E.sx.*, *E.ind.*).

(2). As 1., about 200 m lower. (*An.ga.*).

Loc. 52. Valley of river Eisch, Hollenfels 22.06.1998. WW & NS.

Beech forest on the eastern slope, litter and soil taken along a river. (*E.ar.*, *E.bl.*).

Loc. 53. Valley of river Eisch, near the path "Sept Châteaux", western slope, 22.06.1998. WW & NS. Pine forest with *Lonicera periclymenum* and *Eupatorium cannabinum*, moss, litter and soil.

(*An.ga.*, *Ac.re.*, *Gr.eu.*, *E.ar.*, *E.bl.*, *E.fu.*, *E.sx.*, *E.ss.*, *E.st.*, *E.sm.*, *E.vu.*, *E.we.*, *E.ind.*).

Loc. 54. Valley of river Eisch, between Hobscheid and Koerich, left bank of the river near a bridge and a water supply (spring), 22.06.1998. WW & NS.

(1). Beeches with *Equisetum hyemale*; soil and litter with a large amount of leaves. (*An.af.*, *An.ga.*, *Ac.re.*, *Al.cu.*, *Gr.eu.*, *E.ar.*, *E.sm.*, *E.ind.*).

(2). Beech forest on sandy soil, on a slope of southern exposition, moss and grasses. (*E.ar.*, *E.fu.*, *E.sm.*, *E.vu.*, *E.ind.*).

Loc. 55. Valley of river Eisch, 100-200 m from the border, before Clairefontaine, 22.06.1998. WW & NS.

(1). Forest with spruce and maple, near a spring, soil covered with liverworts. (*E.ar.*, *E.bl.*, *E.ind.*).

(2). Forest with ash, maple, nettles and *Salix caprea*. Litter and alluvial soil. (*An.br.*, *E.ar.*, *E.sm.*, *E.ind.*).

(3). As 2. - soil and litter with a large amount of humus and pieces of decaying timber near a rotten stump. (*An.br.*, *E.bl.*, *E.sm.*).

(4). As 2. - mosses and soil near a small creek. (*An.ga.*, *Ac.re.*, *E.ar.*, *E.bl.*, *E.ind.*).

(5). Forest with spruce and maple on the western slope, moss and sandy soil covered with *Calluna vulgaris*, *Vaccinium myrtillus*, *Oxalis acetosella* and ferns. (*An.ne.*, *E.ss.*, *E.sv.*, *E.sm.*, *E.ind.*).

Loc. 56. Garnich, 18.06.1999. WW.

Beech forest with single oaks, in undergrowth ivy, *Arum maculatum*, elder, young beeches, nettles. (*Ac.re.*, *E.ar.*, *E.bl.*, *E.sm.*, *E.we.*, *E.ind.*).

Loc. 57. Garnich, 18.06.1999. WW.

(1). Litter from the bank of small creek in a field brushwood, near a pasture. (*Ac.re.*, *E.sm.*, *E.um.*, *E.ind.*).

(2). The border of a pasture (grasses, nettles), litter under poplars near a decaying trunk, (*E.sm.*).

Loc. 58. City of Luxembourg, rue Louis Deny. WW.

(1). 23.04.1993. Small house garden on a scarp, soil under single trees and bushes. (*Gr.eu.*, *Al.cu.*).

(2). 21.06.1995., as 1. - under shrubs, litter with

bark. (*Gr.eu.*, *E.ind.*).

(3). As 1. - between ivy and different other shrubs, at foot of a rock, litter with roots of ivy. (*Gr.eu.*, *E.ind.*).

(4). 23.04.1993. Small forest on the escarpment. Sample with *Ficaria* under trees. (*Al.si.*, *Be.po.*, *E.ind.*).

(5). As 4. - sample under spruce covered with ivy. (*Al.nv.*).

(6). 26.06.1995. as 5. (*Al.cu.*, *Al.nv.*, *Gr.eu.*, *E.ar.*, *E.ind.*).

(7). As 4. - sample under nettles (*Al.cu.*, *E.ar.*, *E.ind.*).

(8). As 4. - under trees. (*Gr.eu.*).

Loc. 59. City of Luxembourg, park between rue Louis Deny and the town center. WW.

(1). 23.04.1993. Litter under trees (linden, horse-chestnuts); periwinkle, ivy etc. (*Pr.mi.*, *An.af.*, *Gr.eu.*).

(2). 14.06.1995. as 1. (*Al.cu.*, *E.de.*, *E.ind.*).

Loc. 60. City of Luxembourg, downtown Grund. WW.

(1). 22.04.1993. Near Alzette river, litter and debris under shrubs and grasses. (*Pr.di.*, *Al.nv.*, *E.bl.*, *E.lx.*, *E.de.*, *E.st.*, *E.ind.*).

(2). 15.06.1995. as 1. (*Gr.eu.*, *E.de.*, *E.ind.*).

(3). 16.06.1999. as 1., under shrubs near the water. (*An.af.*, *Al.cu.*, *Gr.eu.*, *E.ar.*, *E.bl.*, *E.de.*, *E.ind.*).

(4). 16.06.1999. as 1., between grasses near the water. (*E.bl.*, *E.de.*, *E.pt.*, *E.ind.*).

(5). Near a chapel, flowered with box and roses, in decaying bark. 22.04.1993. (*Gr.eu.*, *E.de.*, *E.ind.*).

(6). 14.06.1995. as 5. (*An.af.*, *E.de.*, *E.ind.*).

(7). 22.04.1993. as 5, debris under silver fir and thujas. (*Al.nv.*).

(8). 14.06.1995. as 7, (*Ac.re.*, *Al.cu.*, *Al.nv.*).

Loc. 61. Syre Valley between Manternach and Mertert, 17.06.1996. WW & NS.

(1). Spruce forest above the bottom of a gorge on the northern slope; blocks of shell limestone covered with mosses and *Asplenium scolopendrium*; moss and litter. (*E.bl.*, *E.sm.*, *E.ind.*).

(2). As 1.- pieces of decaying timber. (*E.sm.*, *E.ind.*).

(3). As 1. - a patch with *Mercurialis perennis* under spruces; litter and soil. (*E.ar.*, *E.sm.*, *E.ind.*).

(4). As 3. - decaying wood from a stump. (*An.af.*).

(5). Mixed forest above the bottom of a gorge on the northern slope; at foot of limestone rock, litter and soil between *Arum maculatum*. (*Io.ul.*, *E.ar.*, *E.de.*, *E.sm.*, *E.we.*, *E.ind.*).

Loc. 62. Moselle Valley, between Grevenmacher and Mertert, Deysermühle, 25.06.1996. WW & NS.

(1). Small gorge in deciduous forest, slope with northern exposition; soil with leaves and roots. (*An.af.*, *An.ga.*, *Ac.re.*, *E.ar.*, *E.bl.*, *E.ind.*).

(2). As 1. - moss from the bank of a temporary brook. (*An.ga.*).

(3). As 1. - litter and moss from the bed of temporary brook. (*E.ar.*).

(4). As 1. - talus on a slope with southern exposition, soil and mosses. (*An.ga.*, *Ac.re.*, *E.ar.*, *E.sv.*, *E.um.*, *E.ind.*).

(5). As 4. - litter with *Mercurialis perennis*. (*Ac.re.*, *E.ar.*, *E.ind.*).

Loc. 63. Moselle Valley, between Grevenmacher and Mertert, Deysermühle, 25.06.1996. WW & NS.

Abandoned vineyard with a large amount of litter. (*Ac.si.*).

Loc. 64. Moselle Valley, between Ehnen and Lenningen, 25.06.1996. WW & NS.

(1). Northern bank of Lenningerbaach, deciduous forest near a bridge, litter. (*Pr.mi.*, *An.af.*, *E.sm.*).

(2). Northern slope above the Lenningerbaach, deciduous forest with *Clematis vitalba* and ivy on the old terraces of abandoned vineyards. Litter and soli. (*Pt.ba.*, *Pr.nv.*, *An.af.*, *E.ar.*, *E.bl.*, *E.de.*, *E.ind.*).

Loc. 65. Pontpierre, 18.06.1999. WW.

(1). Forest with old oaks, beeches and hornbeams, in undergrowth ivy, *Arum maculatum*, sealwort. (*E.sm.*, *E.ind.*).

(2). Clearing in a coniferous forest, fallen branches and needles, amount of thistles, blackberries, dog roses, willows; on the border of a forest hornbeams

and oaks. (*E.sm.*, *E.ind.*).

Loc. 66. Léiffrächen near Kayl, 11.06.1998. WW & NS.

(1). Thermophilous forest on the limestone, litter under beeches and under a dead tree. (*An.af.*, *An.ga.*, *A.ind.*, *E.ar.*, *E.sx.*, *E.sm.*, *E.ind.*).

(2). As 1. - litter under *Dryopteris filix-mas*. (*E.ar.*, *E.sx.*, *E.sm.*, *E.ind.*).

(3). As 1., litter under *Neottia nidus-avis*, *Asperula odorata* and rotten tree. (*An.ga.*, *E.ar.*, *E.sx.*, *E.sm.*, *E.ind.*).

(4). Abandoned open coast mine of iron ore, mosses, soil and litter under *Salix caprea*. (*An.br.*, *E.de.*, *E.sm.*).

(5). As 4.,- tussocks of mosses and soil. (*E.de.*, *E.ind.*).

(6). As 4., not covered (no mosses) red soil under *Salix caprea* and birch. (*E.ar.*, *E.ind.*).

(7). As 4., soil of the dry meadow on a rock - lichens, mosses and *Fragaria*. (*An.ga.*, *E.bl.*, *E.sm.*).

(8). As 4., dry meadow with *Orchis pyramidalis*. (*Pr.mi.*, *Pr.nv.*, *E.de.*, *E.st.*).

5 List of species

(m. = adult male, f. = adult female, the names of the younger instars are abbreviated as follows: praeimago - pm, matus junior - mj, larva II - l.2, larva I - l.1).

Hesperentomidae

Ionescuellum ulmiacum Rusek & Stumpp, 1989

Mixed forest:

Syre Valley: loc. 61 (5) – 1 f.

Known only from the type locality (Germany, area of Ulm) (Rusek & Stumpp 1989) and a single locality in Luxembourg (fig. 6)

Protentomidae

Proturentomon discretum Condé, 1961

Town parks, gardens etc.: City of Luxembourg: loc. **60** (1) – 1 f.

Known from Balears, Corsica (Nosek 1973), Spain (Aldaba 1985b) and Luxembourg (fig. 4)

Proturentomon minimum (Berlese, 1908)

Deciduous forests: Our Valley, northern part: loc. **7** (3) – 3 f. Moselle Valley: loc. **64** (1) – 10 f., 8 mj.

Town parks, gardens etc.: City of Luxembourg: loc. **59** (1) – 1 f., 2 mj.

Meadows and similar open localities: Area of Kayl: loc. **66** (8) – 3 f.

Recorded from the whole of Europe with the exception of Scandinavia (Nosek 1973), but most of the older data need a revision. In Luxembourg rare (fig. 20).

Proturentomon sp. A

Deciduous forest: Moselle Valley: loc. **64** (2) – 8 f., 3 mj.

Meadows and similar open localities: Area of Kayl: loc. **66** (8) – 2 f., 1 mj.

Probably a new species, but its description needs a revision of similar species. Localities in Luxembourg as fig. 16.

Protentomon barandiarani Condé, 1947

Deciduous forest: Moselle Valley: loc. **64** (2) – 3 f.

Meadows and similar open localities: Area of Baschleiden: loc. **37** (10) – 2 f.

Known from France, England (Nosek 1973), Spain (Aldaba 1983) and two localities in Luxembourg (fig. 15).

Acerentomidae s. l.

Acerentomon affine Bagnall, 1912

Deciduous forests: Our Valley, northern part: loc. **11** (1) – 1 pm. Our Valley, middle part: loc. **22** – 1 f., 1 m., 1 mj, 3 l.2. Our Valley, southern part: loc. **27** (2) – 1 m., 10 l.2, 1 l.1, (3) – 1 f., 2 mj, 5 l.2, 1 l.1, (5) – 1 f., 1 m., 3 l.2, 2 l.1. Area of Vianden: loc. **33** (1) – 1 m. Area of Baschleiden: loc. **36** (4) – 1 m.; loc. **37** (9) – 1 f., 1 m.; loc. **40** (8) – 32 f., 14 m., 5

mj, 47 l.2, 11 l.1. Attert Valley: loc. **42** – 1 f. Area of Vogelsmühle: loc. **45** (3) – 1 l.2; loc. **47** (5) – 15 f., 17 m., 11 pm, 38 mj, 15 l.2, 4 l.1, (6) – 4 f., 5 m., 1 l.2; loc. **48** (2) – 1 f. Eisch Valley: loc. **54** (1) – 4 f., 3 m., 3 mj, 5 l.2, 7 l.1. Moselle Valley: loc. **62** (1) – 1 m.; loc. **64** (1) – 1 f. (2) – 36 f., 19 m., 7 pm, 32 mj, 47 l.2, 16 l.1. Area of Kayl: loc. **66** (1) – 2 f., 1 l.1.

Mixed forests: Our Valley, middle part: loc. **17** – 1 mj, 1 l.2, 1 l.1; loc. **20** (5) – 11 f., 6 m., 3 pm, 9 mj, 19 l.2, 5 l.1. Our Valley, southern part: loc. **26** – 1 m.

Coniferous forests: Our Valley, southern part: loc. **27** (1) – 1 l.2. Area of Baschleiden: loc. **36** (8) – 1 f.. Syre Valley: loc. **61** (4) – 16 f., 10 m., 6 pm, 6 mj, 70 l.2, 18 l.1.

Town parks, gardens etc.: City of Luxembourg: loc. **59** (1) – 1 f; loc. **60** (3) – 8 f., 4 m., 3 mj, 4 l.2, 1 l.1, (6) – 2 mj.

Meadows and similar open localities: Area of Baschleiden: loc. **37** (8) – 1 f.

Bank of rivers, streams etc.: Direndall: loc. **51** (1) – 11 f., 5 m., 5 pm, 14 mj, 5 l.2, 5 l.1.

Petrophilous communities: Area of Vianden: loc. **34** (2) – 2 f., 1 m.

West European species known from England, France, Sweden, Germany, Austria (Nosek 1973), Spain (Aldaba 1985a) and Luxembourg. Collected mostly in forests; common and numerous in the whole area.

Acerentomon brevisetosum Condé, 1945

Deciduous forests: Our Valley, northern part: loc. **11** (3) – 1 f. Area of Baschleiden: loc. **36** (4) – 1 f., 2 mj, 1 l.2. Area of Vogelsmühle: loc. **45** (3) – 1 f; loc. **47** (3) – 1 f., (5) – 1 l.2. Eisch Valley: loc. **55** (2) – 2 f., 1 m., 1 pm, 1 mj, (3) – 1 mj. Area of Kayl: loc. **66** (4) – 1 f., 2 m., 3 mj.

Mixed forests: Area of Baschleiden: loc. **36** (6) – 1 f.

Meadows and similar open localities: Our Valley, southern part: loc. **27** (7) – 1 m., 1 mj, 1 l.2.

Till now only known from the type locality (France, Plateau lorrain - Nosek 1973) and Luxembourg. Forest species in the whole area, rare (fig. 4).

Acerentomon gallicum Ionescu, 1933

Deciduous forests: Our Valley, northern part: loc. 5 (1) - 4 f, 1 m., 3 mj; loc. 6 (4) - 1 f.; loc. 7 (2) - 1 f., 1 mj, 1 l.2; loc. 11 (1) - 1 l.2, (3) - 3 f., 2 m., 1 pm, 3 l.2, 3 l.1. Our Valley, middle part: loc. 20 (7) - 1 f. Our Valley, southern part: loc. 27 (2) - 6 f., 2 m., 1 pm, 1 mj, 3 l.2, (3) - 1 f., (5) - 3 f., 1 m., 1 pm. Attert Valley: loc. 43 - 1 f., 1 mj. Area of Vogelsmühle: loc. 45 (3) - 2 f., 1 m., 1 mj; loc. 47 (3) - 1 f., 1 m., 1 pm, 1 mj, 1 l.2, (4) - 1 f., 1 pm, (5) - 1 f., 2 l.2; loc. 48 (1) - 5 f., 1 m., 2 mj, 1 l.2, (2) - 19 f., 10 m., 12 pm, 12 mj, 11 l.2, 8 l.1. Eisch Valley: loc. 54 (1) - 5 f., 1 m., 1 pm, 9 mj, 4 l.2, 5 l.1; loc. 55 (4) - 2 f., 1 l.2. Moselle Valley: loc. 62 (1) - 1 mj, 1 l.1, (2) - 1 f., 1 m.; (4) - 2 f., 1 m., 7 l.2, 1 l.1. Area of Kayl: loc. 66 (1) - 13 f., 5 m., 2 pm, 13 mj, 3 l.2, 28 l.1, (3) - 3 mj, 1 l.2, 1 l.1.

Mixed forests: Area of Troisvierges: loc. 1 (2) - 1 f., 3 m. Our Valley, middle part: loc. 12 - 1 f., 1 l.1; loc. 17 - 3f., 4m. Our Valley, southern part: loc. 26 - 1 mj.

Coniferous forests: Our Valley, northern part: loc. 6 (3) - 1 l.2; loc. 10 (1) - 6f., 2m., 1 pm, 2 mj, 2 l.2. Our Valley, middle part: loc. 20 (6) - 1 mj. Area of Vianden: loc. 28 - 4m. Area of Baschleiden: loc. 36 (5) - 1 mj. Eisch Valley: loc. 53 - 4 l.1.

Meadows and similar open localities: Our Valley, southern part: loc. 27 (6) - 1 f., 1 m., 1 mj, 1 l.2, 1 l.1, (7) - 3 f., 3 m., 1 pm, 2 mj, 4 l.2, 5 l.1. Area of Vianden: loc. 34 (1) - 1 mj.

Bank of rivers, streams etc.: Our Valley, northern part: loc. 10 (2) - 1 f. Direndall: loc. 51 (1) - 1 f., 2 m., (2) - 1 m.

Petrophilous communities: Our Valley, middle part: loc. 16 - 4 f., 1 pm, 1 l.2, 1 l.1. Area of Kayl: loc. 66 (7) - 2 l.2.

No data: Our Valley, middle part: loc. 23 - 1 f., 1 m., 2 l.1.

West European species known from France, Germany, Austria, Slovakia (Nosek 1973), Poland (Szeptycki 1980) and Luxembourg. Collected mostly in the forests, common and numerous in the whole area (fig. 6).

Acerentomon nemorale Womersley, 1927

Deciduous forests: Area of Troisvierges: loc. 3 (3) - 3 f., 2 m., 3 pm, 2 mj. Our Valley, northern part:

loc. 5 (1) - 3 m., (3) - 2 f.; loc. 6 (1) - 1 f., (4) - 1 f., 2 mj; loc. 7 (2) - 1 l.2, 2 l.1; loc. 11 (1) - 1 f., 2 m., 1 pm, 7 mj, 6 l.2, (3) - 1 m., (4) - 9 f., 5 m., 6 pm, 17 mj, 9 l.2, 2 l.1. Our Valley, middle part: loc. 18 (1) - 1 m., 1 mj, 1 l.2, 1 l.1; loc. 20 (7) - 29 f., 23 m., 4 pm, 17 mj, 22 l.2, 10 l.1; loc. 22 - 1 l.2. Our Valley, southern part: loc. 24 - 3 l.2, 1 l.1; loc. 27 (2) - 2 pm, 4 mj, 5 l.2, 3 l.1, (3) - 1 l.2, (4) - 1 mj, 1 l.2, (5) - 1 m., 2 l.1. Area of Vianden: loc. 29 (1) - 2 f., 2 m., 3 pm, 3 mj, 3 l.2, 2 l.1, (2) - 1 f., 1 pm, 1 l.2, (3) - 7 f., 6 m., 6 pm, 7 mj, 3 l.2, 4 l.1; loc. 30. (1) - 1 f., 1m., 3 pm, 1 l.1, (2) - 1 f.; loc. 33 (2) - 6 f., 2 m., 2 pm, 1 mj, 5 l.2, 2 l.1. Area of Baschleiden: loc. 36 (1) - 1 f., 1 m., 1 pm, 5 mj, 1 l.1, (3) - 5 f., 2 m., 2 l.1, (4) - 21 l.1; loc. 37 (1) - 16 f., 7 m., 3 pm, 13 mj, 5 l.2, 4 l.1, (4) - 1 f., (5) - 1 m., 1 l.2, (9) - 1 m.; loc. 38 (1) - 21 f., 7 m., 7 pm, 32 mj, 24 l.2, 5 l.1, (2) - 1 f., 2 m., 1 mj, 1 l.2; loc. 40 (5) - 2 f., 4 m., 1 mj, 2 l.2, 3 l.1, (8) - 1 m., 1 pm, 1 mj, 3 l.2, 4 l.1.

Mixed forests: Area of Troisvierges: loc. 1 (1) - 5 f., 2 m., 1 l.1, (2) - 2 f., 1 m., 2 mj, 1 l.2. Our Valley, middle part: loc. 12 - 1 f., 1 mj, 2 l.2; loc. 17 - 2 f., 2 m., 1 mj; loc. 20 (5) - 3 mj, 1 l.2, 1 l.1. Area of Baschleiden: loc. 40 (7) - 3 f., 9 m., 5 pm, 2 mj, 1 l.2. Eisch Valley: loc. 55 (5) - 3 f., 4 m., 4 pm, 6 mj, 6 l.2.

Coniferous forests: Area of Troisvierges: loc. 4 (2) - 1 mj. Our Valley, northern part: loc. 7 (1) - 4 f., 1 m., 1 pm; loc. 10 (1) - 1 f., 1 m., 1 pm. Our Valley, middle part: loc. 13 (1) - 2 m., 1 l.2; loc. 21 (1) - 1 f., 3 m., 2 mj, 11 l.2, 8 l.1, (2) - 1 l.1. Area of Baschleiden: loc. 36 (8) 1 f., 1 m.; loc. 37 (2) - 9 f., 3 m., 6 pm, 7 mj, 3 l.2, 2 l.1, (3) - 3 m., 1 mj, 1 l.2.

Banks of rivers, streams etc.: Area of Troisvierges: loc. 4 (3) - 1 m., 2 pm. Our Valley, northern part: loc. 9 (2) - 1 m.

Meadows and similar open localities: Area of Troisvierges: loc. 3 (1) - 1 f., 1 mj, (3) - 3 f., 2 m., 3 pm, 2 mj. Area of Baschleiden: loc. 37 (8) - 2 m.; loc. 40 (6) - 1 f., 2 m.

Petrophilous communities: Area of Troisvierges: loc. 4 (1) - 1 f., mj. Our Valley, northern part: loc. 10 (3) - 1 f. Area of Vianden: loc. 33 (3) - 2 f., 1 m.; loc. 34 (2) - 1 f., 1 m. Area of Baschleiden: loc. 36 (2) - 1 f., 1 m.

West European species recorded from England, Austria, Czech Republic (Nosek 1973), Germany

(Alberti & all., 1989) and Luxembourg. Collected mostly in forests, common and numerous, but only in the northern part of the country (fig. 6).

Acerella remyi (Condé, 1944)

Deciduous forests: Area of Baschleiden: loc. **37** (4) - 6 f., 2 m., (5) - 10 f., 2 m., 5 pm, 7 mj, 1 l.2, (6) - 1 f. Area of Vogelsmühle: loc. **45** (2) - 1 m., (3) - 1 f., 1 m., 1 pm, 1 l.2; loc. **48** (2) - 3 f., 2 m., 1 pm, 1 l.2, (4) - 1 m. Eisch Valley: loc. **54** (1) - 5 f., 10 l.2, 4 l.1; loc. **55** (4) - 1 mj, 1 l.2. Garnich: loc. **56** - 2 f., 1 pm, 3 l.2, 1 l.1; loc. **57** (1) - 1 f. Moselle Valley: loc. **62** (1) - 4 f., 10 l.1, (4) - 1 f., 2 m., 5 l.1, (5) - 7 f., 5 m., 1 mj, 20 l.1.

Mixed forests: Area of Baschleiden: loc. **36** (7) - 1 f.

Coniferous forests: Area of Vianden: loc. **28** - 1 f. Area of Baschleiden: loc. **36** (5) - 2 f., 1 m. Eisch Valley: loc. **53** - 1 f., 1 m., 2 mj, 3 l.2, 2 l.1.

Town parks, gardens etc.: City of Luxembourg: loc. **60** (8) - 1 f.

Meadows and similar open habitats: Our Valley, southern part: loc. **27** (6) - 2 l.1. Area of Baschleiden: loc. **36** (9) - 2 f., 1 m., 4 l.1, (10) - 1 f.; loc. **37** (10) - 10 f., 4 m., 1 l.1, (11) - 1 f., (12) - 2 l.2, 2 l.1; loc. **38** (3) - 7 f., 3 pm, 1 mj.

Petrophilous communities: Area of Vogelsmühle: loc. **48** (3) - 1 f.

Acerella remyi (Condé, 1944) has been synonymised by Tuxen (1964) with *A. muscorum* (Ionescu, 1930). I cannot agree with his opinion. *A. remyi* differs from *A. muscorum* in the presence of seta *P1a'* on nota and seta *P1a* on urotergites I-V (in *muscorum* both mentioned setae are absent), and in the labial palp with 4 setae (in *muscorum* there are 3 setae) (fig. 2). All the mentioned characters are stable in the relatively large material of both species I have studied.

I agree with Tuxen that *A. filisensillata* (Gisin, 1945) is conspecific with *remyi*, so the species under question is actually known from France, Switzerland and Luxembourg. It was collected both in forests and open habitats in the whole area (fig. 7).

Acerentulus cunhai Condé, 1950

Deciduous forests: Area of Vogelsmühle: loc. **45** (2) - 1 f., (3) - 4 f. Eisch Valley: loc. **54** (1) - 2 f.

Town parks, gardens etc.: City of Luxembourg: loc. **58** (1) - 1 f., 1 l.1, (6) - 1 f., (7) - 2 l.2, 1 l.1; loc. **59** (2) - 2 l.1; loc. **60** (3) - 1 l.1, (8) - 2 l.1.

Banks of the rivers, streams etc.: Area of Baschleiden: loc. **36** (11) - 1 l.1.

Known from Portugal, Ireland, France, Sweden (Nosek 1973), Poland (Szeptycki 1991) and Luxembourg. In some areas it is probably introduced. In Luxembourg mostly in gardens, parks and similar localities (fig. 8).

Acerentulus silvanus Szeptycki 1991

Town parks, gardens etc.: City of Luxembourg: loc. **58** (4) - 1 f., 1 l.1. Moselle Valley: loc. **63** - 1 f.

Till now, only known from Poland (Szeptycki, 1991) and Luxembourg (fig. 10).

Acerentulus sp. A.

Town parks, gardens etc.: City of Luxembourg: loc. **58** (5) - 1 f., (6) - 3 f., 2 m., 3 pm, 8 mj; loc. **60** (1) - 2 m., (7) - 1 pm, 1 l.2, (8) - 4 f., 1 mj.

Probably a new species, but its description needs a revision of similar species. Localities in Luxembourg as fig. 5.

Najtentulus silvestris Szeptycki & Weiner, 1997

Coniferous forest: Our Valley, middle part: loc. **18** (3) - 2 f.

Known from France and a single locality in Luxembourg (Szeptycki & Weiner 1997) (fig. 7).

Gracilentulus europeus Szeptycki, 1993

Deciduous forests: Eisch Valley: loc. **54** (1) - 22 f., 6 mj, 1 l.1.

Coniferous forests: Our Valley, middle part: loc. **18** (3) - 4 f. Eisch Valley: loc. **53** - 1 mj.

Town parks, gardens etc.: City of Luxembourg: loc. **58** (1) - 1 f., (2) - 21 f., 1 l.2, (3) - 1 mj, (6) - 4 f., 2 mj, (8) - 6 f., 1 mj, 1 l.2; loc. **59** (1) - 3 f.; loc. **60** (2) - 1 l.2, (3) - 1 f., (5) - 1 mj.

Petrophilous communities: Area of Troisvierges:

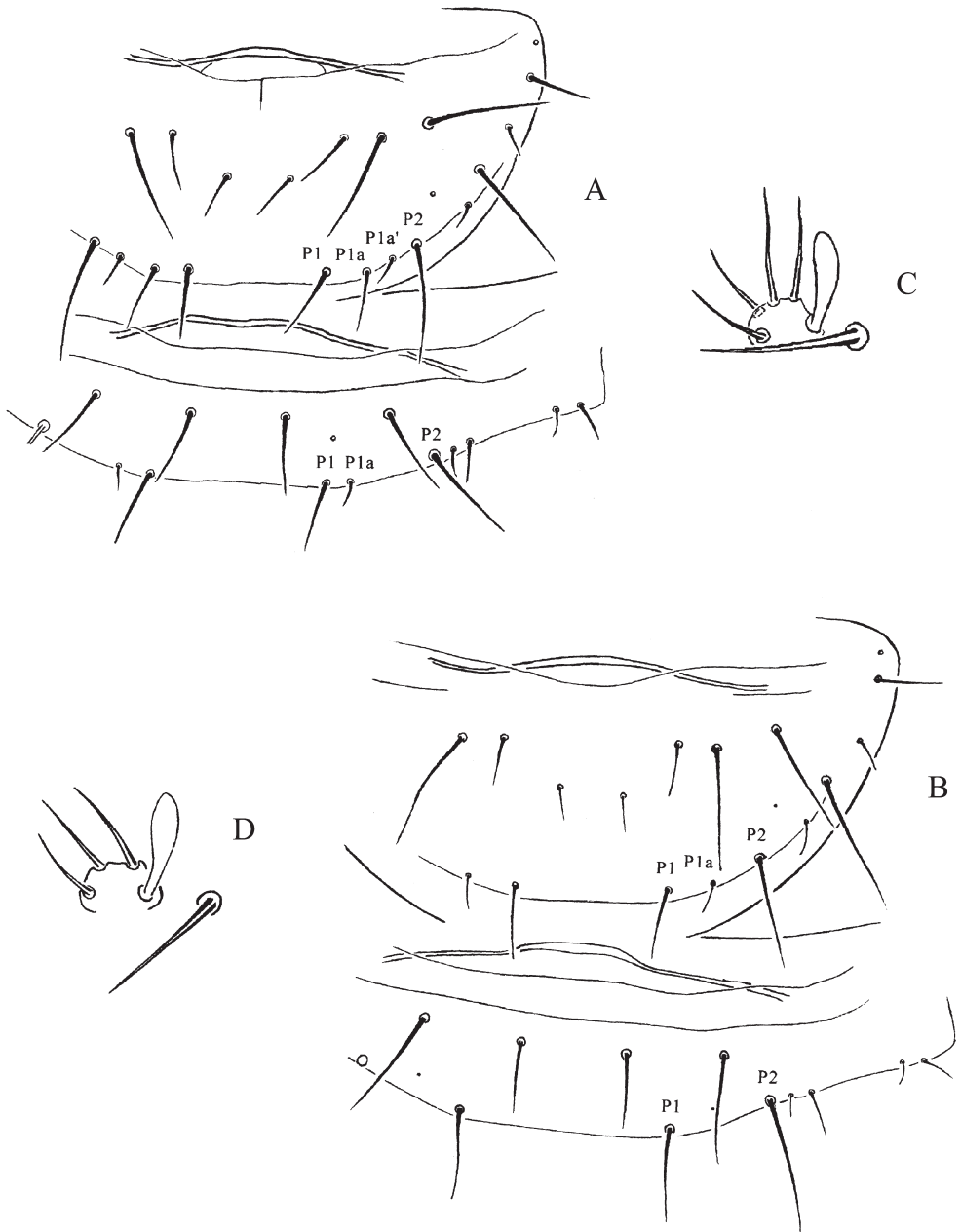


Fig. 2. A, B - Metanotum and I urotergite of *Acerella remyi* (A) and *A. muscorum* (B); C, D - Labial palp of *Acerella remyi* (C) and *A. muscorum* (D).

loc. 2 - 1 mj.

Known from Poland, France, Portugal, USA (Delaware) (Szeptycki 1993) and Luxembourg (fig. 8). It is especially common in the parks, gardens and similar synanthropic habitats. In many localities it makes probably parthenogenetic populations - from Luxembourg no males were found.

Berberentulus polonicus Szeptycki, 1968

Town parks, gardens etc.: City of Luxembourg: loc. 58 (4) - 1 f.

Till now only known from Poland (Nosek 1973) and single locality from Luxembourg (fig. 12).

Eosentomidae

Eosentomon armatum Stach, 1927.

Deciduous forests: Our Valley, northern part: loc. 5 (3) - 2 f., 1 m.; loc. 6 (4) - 1 f., 1 m.; loc. 11 (1) - 1 f., (3) - 1 f., (4) - 10 mj. Our Valley, middle part: loc. 15 (2) - 1 m., 2 mj; loc. 18 (1) - 1 f.; loc. 20 (1) - 3 f.; loc. 22 - 4 mj. Our Valley, southern part: loc. 27 (3) - 1 f., 1 mj, (4) - 1 f., 1 mj, (5) - 1 f. Area of Vianden: loc. 30 (1) - 1 m., (2) - 1 f. Area of Baschleiden: loc. 37 (1) - 1 f., (5) - 1 f., (9) - 8 f., 6 m., (15) - 1 f., 3 m., 1 mj; loc. 38 (1) - 10 mj; loc. 40 (8) - 4 f., 2 m., 1 mj. Attert Valley: loc. 41 - 2 f., 1 m., 2 mj; loc. 42 - 2 m. Area of Vogelsmühle: loc. 45 (2) - 1 mj, (3) - 4 f., 1 m., 16 mj; loc. 47 (3) - 3 f., 1 m., (4) - 3 f., 3 m., 3 mj, (5) - 3 mj, (6) - 15 f., 12 m., 1 mj; loc. 48 (1) - 2 m., 2 mj, (2) - 2 f., 2 m., 2 mj. Eisch Valley: loc. 52 - 1 f.; loc. 54 (1) - 7 f., 2 m., 1 mj, (2) - 2 m., 1 mj; loc. 55 (2) - 4 f., 1 m., 3 mj, (4). As (2) - 3 f. Garnich: loc. 56 - 1 f. Moselle Valley: loc. 62 (1) - 2 f., 1 m., 1 mj, (3) - 1 f., (4) - 4 f., 2 m., 1 mj, (5) - 1 f., 1 m., 1 mj; loc. 64 (2) - 1 mj. Area of Kayl: loc. 66 (1) - 1 mj, (2) - 1 f., 1 m., (3) - 1 f., 1 mj.

Mixed forests: Area of Troisvierges: loc. 1 (2) - 1 m. Our Valley, middle part: loc. 17 - 1 m., 1 mj. Our Valley, southern part: loc. 26 - 1 f. Eisch Valley: loc. 55 (1) - 7 f., 5 m. Syre Valley: loc. 61 (5) - 2 f., 2 m., 1 mj.

Coniferous forests: Our Valley, northern part: loc. 6 (3) - 2 f., 3 m., 1 mj. Our Valley, middle part: loc. 18 (3) - 1 f.; loc. 20 (2) - 2 f., 8 m., 4 mj, (6) - 4 mj; loc.

21 (1) - 1 mj. Area of Baschleiden: loc. 36 (5) - 1 f., 6 m., 2 mj; loc. 37 (3) - 1 m. Eisch Valley: loc. 53 - 1 mj. Syre Valley: loc. 61 (3) - 1 f., 1 mj.

Town parks, gardens etc.: Area of Baschleiden: loc. 39 - 1 f. City of Luxembourg: loc. 58 (6) - 1 f., 1 m, (7) - 1 m.; loc. 60 (3) - 1 mj.

Meadows and similar open localities: Our Valley, middle part: loc. 20 (3) - 3 mj, (4) - 1 m., 1 mj. Area of Baschleiden: loc. 35 (3) - 1 f.; loc. 37 (11) - 2 f., 1 m., (12) - 1 f., 1 m.; loc. 40 (3) - 1 m., (6) - 1 mj, (9) - 2 f. Area of Kayl: loc. 66 (6) - 1 f., 5 mj.

Banks of rivers, streams etc.: Our Valley, middle part: loc. 15 (1) - 2 f., 2 m., 2 mj; loc. 18 (2) - 1 m.

Petrophilous communities: Area of Troisvierges: loc. 4 (1) - 1 f. Area of Vianden: loc. 32 - 1 mj; loc. 34 (2) - 1 f.

No data: Our Valley, middle part: loc. 23 - 1 mj.

Since a long time *E. armatum* has been mistaken with *E. transitorium* Berlese, 1908 and the other similar species. It is probably widely distributed in the Middle and Western Europe, but the reliable records exist till now only from Poland (Szeptycki 1985a), Germany (Alberti & all. 1989) and Luxembourg. Common species in the whole area (fig. 9), found in all studied habitats.

Eosentomon bloszyki Szeptycki, 1985.

Deciduous forests: Our Valley, northern part: loc. 11 (1) - 1 f. Eisch Valley: loc. 52 - 1 m.; loc. 55 (3) - 1 f., (4) - 1 f., 7 m., 1 mj. Garnich: loc. 56 - 2 f. Moselle Valley: loc. 62 (1) - 2 f.; loc. 64 (2) - 14 f, 15 m., 4 mj.

Mixed forests: Eisch Valley: loc. 55 (1) - 1 f.

Coniferous forests: Eisch Valley: loc. 53 - 1 m., 2 mj. Syre Valley: loc. 61 (1) - 1 f., 3 m., 6 mj.

Town parks, gardens etc.: City of Luxembourg: loc. 60 (1) - 1 m., (3) - 1 m., (4) - 1 m.

Meadows and similar open localities: Our Valley, northern part: loc. 8 - 3 m. Area of Baschleiden: loc. 35 (3) - 3 mj; loc. 36 (9) - 1 m., (10) - 1 mj; loc. 37 (8) - 19 f., 21 m., 4 mj, (12) - 1 f.; loc. 40 (1) - 2 mj, (2) - 1 f., 1 m., (4) - 1 f., 1 m., (6) - 1 f., 1 m., (9) - 1 f. Area of Grünwald: loc. 49 (1) - 4 f., 2 m., (2) - 1 f., 3 m., 2 mj.

Petrophilous communities: Area of Troisvierges: loc. 2 - 1 mj. Area of Vianden: loc. 32 - 1 m. Area of

Kayl: loc. 66 (7) - 1 m.

No data: Our Valley, middle part: loc. 23 - 1 f., 1 m., 1 mj.

Till now, recorded from Poland (Szeptycki 1985a), Czech Republic (Rusek 1989), Slovakia (Rusek 1993) and Luxembourg (fig. 10). Common in the whole area, found in most of the studied habitats.

Eosentomon delicatum Gisin, 1945.

Deciduous forests: Our Valley, northern part: loc. 7 (3) - 2 f., 1 m., 1 mj; loc. 9 (1) - 1 f., 1 m.; loc. 11 (1) - 1 mj, (3) - 1 mj. Area of Vianden: loc. 30 (2) 1 mj. Area of Baschleiden: loc. 36 (3) - 1 f., 1 m., (4) - 1 m.; loc. 37 (7) - 1 m. Area of Vogelsmühle: loc. 48 (1) - 3 f., 5 m. Moselle Valley: loc. 64 (2) - 11 f., 3 m., 1 mj. Area of Kayl: loc. 66 (4) - 1 f., 1 m.

Mixed forests: Our Valley, middle part: loc. 17 - 1 f. Syre Valley: loc. 61 (5) - 1 m.

Town parks, gardens etc.: City of Luxembourg: loc. 59 (2) - 1 f., 1 m.; loc. 60 (1) - 2 f., 2 m., 2 mj, (2) - 2 f., 3 m., (3) - 2 f., 1 m, (4) - 1 m., (5) - 1 f., 2 m., (6) - 1 f., 1 mj.

Meadows and similar open localities: Our Valley, southern part: loc. 25 - 2 f. Area of Baschleiden: loc. 35 (3) - 1 m.; loc. 37 (8) - 1 f., 1 m., 1 mj, (12) - 4 f., 3 m.; loc. 40 (2) - 1 f. Area of Grünewald: loc. 49 (1) - 1 f. Area of Kayl: loc. 66 (5) - 1 m., (8) - 1 m.

Banks of rivers, streams etc.: Area of Troisvierges: loc. 4 (3) - 1 mj. Our Valley, middle part: loc. 19 - 1 f., 1 m.

No data: Our Valley, middle part: loc. 23 - 1 mj.

Probably whole Europe (Nosek 1973), but not all of the older data are reliable. Collected mostly in forests, parks etc., and meadows, common in the whole area (fig. 11)

Eosentomon funkei Rusek, 1988

Deciduous forests: Our Valley, northern part: loc. 7 (2) - 1 m. Our Valley, middle part: loc. 14 - 1 m., 1 mj; loc. 18 (1) - 2 f., 3 mj; loc. 20 (7) - 1 f., 3 mj. Area of Vianden: loc. 29 (3) - 1 m. Area of Baschleiden: loc. 36 (1) - 4 f., 1 m., 1 mj, (3) - 1 f.&; loc. 38 (1) - 1 f. Attert Valley: loc. 43 - 1 mj. Area of Grünewald: loc. 50 (1) - 4 f., 1 m., 1 mj, (2) - 2 f., 1 mj. Eisch Valley: loc. 54 (2) - 3 f., 1 m., 2 mj.

Mixed forests: Area of Grünewald: loc. 50 (3) - 1 f.

Coniferous forests: Our Valley, northern part: loc. 5 (2) - 7 f.; loc. 6 (3) - 1 f., 1 m. Our Valley, middle part: loc. 13 (1) - 1 m., 7 mj; loc. 20 (2) - 1 m., 1 mj. Area of Baschleiden: loc. 37 (3) - 1 m. Eisch Valley: loc. 53 - 3 f.

Meadows and similar open localities: Our Valley, southern part: loc. 27 (7) - 3 f., 1 m., 1 mj.

Bank of rivers, streams etc.: Our Valley, northern part: loc. 9 (2) - 1 f., 1 mj.

Petrophilous communities: Area of Vianden: loc. 32 - 2 mj; loc. 34 (2) - 1 f.

No data: Our Valley, middle part: loc. 23 - 1 mj.

Known only from Germany (Rusek 1988) and Luxembourg. It was collected mostly in forests, rarely in petrophilous turfs and meadows. It seems to be more common in the northern part of the country (fig. 12).

Eosentomon luxembourgense Szeptycki, 2001

Town parks, gardens etc.: City of Luxembourg: loc. 60 (1) - 36 f., 3 m., 3 mj, 3 l.2.

Known only from Luxembourg (Szeptycki (2001) (fig. 19).

Eosentomon mariae Szeptycki, 1986.

Deciduous forests: Our Valley, northern part: loc. 7 (2) - 7 f., 5 m., 4 mj; loc. 9 (1) - 1 m. Our Valley, middle part: loc. 14 - 1 f.; loc. 18 (1) - 1 f., 2 m. Our Valley, southern part: loc. 27 (2) - 1 f., 2 m., 1 mj, (5) - 4 f., 1 m., 1 mj.

Mixed forests: Our Valley, middle part: loc. 20 (5) - 1 m.

Coniferous forests: Area of Troisvierges: loc. 4 (2) - 1 mj. Our Valley, northern part: loc. 5 (2) - 1 f., 2 m., 5 mj; loc. 6 (3) - 5 f., 2 m., 3 mj. Our Valley, middle part: loc. 20 (2) - 38 f., 31 m., 13 mj. Area of Vianden: loc. 28 - 1 f., 1 mj.

Meadows and similar open localities: Our Valley, middle part: loc. 13 (2) - 10 f., 12 m., 15 mj. Our Valley, southern part: loc. 27 (6) - 1 m., (7) - 2 mj.

Banks of rivers, streams etc.: Our Valley, northern part: loc. 9 (2) - 2 m., 1 mj. Direndall: loc. 51 (1) - 1 mj.

Known from Poland, Germany (Szeptycki 1986) and Luxembourg. Collected mostly in forests. It is common in the northern part of the country (fig. 14).

Eosentomon pastorale Szeptycki, 2001

Town parks, gardens etc.: City of Luxembourg: loc. **60** (4) - 1 mj.

Meadows and similar open localities: Area of Baschleiden: loc. **37** (12) - 15 f., 13 m., 21 mj, 9 l.2.

Known only from Luxembourg (Szeptycki 2001) (fig. 13).

Eosentomon paucrum Szeptycki, 2001

Deciduous forests: Our Valley, northern part: loc. **11** (1) - 3 f., 3 m., 2 mj. Area of Vianden: loc. **30** (2) - 1 m.

Known only from Luxembourg (Szeptycki 2001) (fig. 8).

Eosentomon sexsetosum Szeptycki, 1985.

Deciduous forests: Area of Kayl: loc. **66** (1) - 7 f., 7 m., 7 mj, 30 l.1, (2) - 1 f., 4 m., 1 mj, 4 l.1, (3) - 1 m., 5 mj, 1 l.2, 8 l.1.

Coniferous forests: Our Valley, middle part: loc. **20** (2) - 1 m. Eisch Valley: loc. **53** - 1 f., 1 m., 3 mj.

Banks of rivers, streams etc.: Direndall: loc. **51** (1) - 2 f., 1 m.

Known only from Poland (Szeptycki 1985b) and Luxembourg (fig. 15). Rare species, mostly collected in forests.

Eosentomon silesiacum Szeptycki, 1985.

Deciduous forests: Our Valley, northern part: loc. **5** (1) - 1 m.; loc. **6** (4) 2 f., 1 mj; loc. **7** (2) - 1 f., 2 m.; loc. **11** (4) - 1 f. Our Valley, middle part: loc. **18** (1) - 2 mj; loc. **20** (1) - 1 m. Our Valley, southern part: loc. **27** (5) - 5 mj. Area of Vianden: loc. **31** (1) - 1 f., 2 m., 6 mj; loc. **33** (2) - 1 mj. Area of Baschleiden: loc. **36** (1) - 2 f., 5 mj; loc. **38** (1) - 1 f., 1 m., 2 l.2. Attert Valley: loc. **43** - 2 f., 2 mj.

Mixed forests: Area of Troisvierges: loc. **1** (2) - 5 mj, (3) - 1 mj. Our Valley, northern part: loc. **11** (2) - 1 l.2. Our Valley, middle part: loc. **17** - 1 mj; loc.

20 (5) - 1 l.2. Area of Vogelsmühle: loc. **46** (1) - 2 m. Eisch Valley: loc. **55** (5) - 3 f., 2 m., 1 mj, 4 l.2.

Coniferous forests: Area of Troisvierges: loc. **4** (2) - 1 m. Area of Baschleiden: loc. **36** (5) - 1 f., (6) - 2 f., 2 m., 2 mj; loc. **37** (3) - 2 f., 6 m., 4 mj, 1 l.2. Eisch Valley: loc. **53** - 1 m.

Meadows and similar open localities: Our Valley, middle part: loc. **13** (2) - 2 f., 3 m., 4 mj, 11 l.2. Our Valley, southern part: loc. **27** (7) - 1 f., 2 m., 2 mj. Area of Baschleiden: loc. **40** (6) - 1 m.

Petrophilous communities: Area of Troisvierges: loc. **2** - 1 f.; loc. **3** (2) - 1 f. Area of Vianden: loc. **32** - 1 mj; loc. **33** (3) - 1 mj. Area of Baschleiden: loc. **36** (2) - 1 f.

No data: Our Valley, middle part: loc. **23** - 1 mj.

Till now known from Poland (Szeptycki 1985b), Czech Republic (Rusek 1988), Germany (Alberti & all. 1989) and Luxembourg. Common species, collected mostly in the northern part of the country (fig. 16) in the forests, the petrophilous associations, and the meadows.

Eosentomon silvaticum Szeptycki, 1986.

Deciduous forests: Area of Vianden: loc. **29** (1) - 1 f. Area of Vogelsmühle: loc. **45** (3) - 1 f.; loc. **47** (1) - 4 f., 3 m., 2 mj, (3) 5 f., 2 m., 1 mj, (4) - 2 f., 1 m., 4 mj; loc. **48** (1) - 1 m., 1 mj, (2) - 3 f., 1 m. Moselle Valley: loc. **62** (4) - 8 f., 6 m., 4 mj.

Mixed forests: Area of Vogelsmühle: loc. **46** (2) - 1 f. Area of Grünwald: loc. **50** (3) - 1 m. Eisch Valley: loc. **55** (5) - 2 f.

Known only from Poland (Szeptycki 1986) and Luxembourg. In Luxembourg rare (fig. 17), collected only in forests.

Eosentomon stachi Rusek, 1966.

Deciduous forests: Our Valley, northern part: loc. **9** (1) - 2 f.

Coniferous forests: Our Valley, middle part: loc. **20** (2) - 1 f., 1 mj. Eisch Valley: loc. **53** - 1 m.

Town parks, gardens etc.: City of Luxembourg: loc. **60** (1) - 1 mj.

Petrophilous communities: Area of Vianden: loc. **32** - 4 m., 3 mj.

Meadows and similar open localities: Area of

Baschleiden: loc. 35 (1) - 1 m. Area of Kayl: loc. 66 (8) - 1 mj.

Known from Slovakia (Nosek 1973) and Poland (Szeptycki 1985a). In Luxembourg rare (fig. 18), probably in the whole area, in different habitats.

Eosentomon stompi Szeptycki & Weiner, 1993.

Deciduous forests: Our Valley, northern part: loc. 5 (3) - 1 m.; loc. 6 (1) - 1 f. Our Valley, middle part: loc. 15 (2) - 1 f., 1 l.2.; loc. 20 (1) - 1 f., 6 m., 5 l.2. Our Valley, southern part: loc. 27 (3) - 2 f., (4) - 1 f., 1 m. Area of Vianden: loc. 29 (2) 1 m.; loc. 30 (2) - 2 f. Area of Baschleiden: loc. 37 (1) - 1 f., 2 m., 1 mj, (4) - 1 f., 1 m., (6) - 1 m., (7) - 1 m. (9) - 3 m. Attert Valley: loc. 42 - 1 f. Area of Vogelsmühle: loc. 45 (2) - 1 f., 1 m., 2 l.2., (3) - 2 f., 2 mj, 1 l.2.; loc. 47 (5) - 1 mj, 2 l.2.; loc. 48 (1) - 2 f., 2 m., 4 l.2., (2) - 1 f., 2 m., 2 mj. Area of Grünewald: loc. 50 (2) - 1 f. Eisch Valley: loc. 54 (1) - 1 m., 1 l.2.; loc. 55 (2) - 1 %, (3) - 1 &. Garnich: loc. 56 - 3 l.2.; loc. 57 (1) - 1 &, 1 mj, 9 l.2. Moselle Valley: loc. 64 (1) - 1 f., 11 l.2. Pontpierre: loc. 65 (1) - 1 f. Area of Kayl: loc. 66 (1) - 1 m., 1 mj, 3 l.1., (2) - 7 f., 5 m., 1 mj, 23 l.2, 8 l.1., (3) - 1 l.2., (4) - 1 l.2.

Mixed forests: Area of Troisvierges: loc. 1 (2) - 1 f., 1 m. Eisch Valley: loc. 55 (5) - 3 f., 1 m., 1 mj, 3 l.2. Syre Valley: loc. 61 (5) - 1 f., 1 mj, 1 l.2.

Coniferous forests: Our Valley, middle part: loc. 18 (3) - 1 l.2.; loc. 20 (2) - 2 f., 1 mj. Area of Baschleiden: loc. 37 (3) 1 f. Eisch Valley: loc. 53 - 3 f., 1 l.2. Syre Valley: loc. 61 (1) 2 f., 11 m., 3 mj, (2) - 3 f., 1 m., (3) - 2 f., 2 m.

Meadows and similar open localities: Our Valley, southern part: loc. 27 (6) 1 l.2., (7) - 1 f., 4 m., 2 l.2. Area of Baschleiden: loc. 35 (1) - 2 m., 1 l.2., (2) - 1 f., 1 mj, 4 l.2., (4) - 3 l.2.; loc. 36 (9) - 1 f.; loc. 37 (8) - 5 f., (11) - 1 m., 1 l.2., (12) - 1 m., 1 mj, 4 l.2., (14) - 1 f., (16) - 9 f., 9 m., 12 l.2.; loc. 38 (3) - 1 m., 2 mj; loc. 40 (2) - 1 m., (3) - 1 f., (6) - 11 f., 3 m., 1 mj, (9) - 2 m., 1 l.2. Garnich: loc. 57 (2) - 1 l.2. Pontpierre: loc. 65 (2) - 1 l.2.

Banks of rivers, streams etc.: Area of Baschleiden: loc. 36 (11) - 3 f., 2 m.

Petrophilous communities: Area of Troisvierges: loc. 4 (1) - 1 mj. Our Valley, northern part: loc. 10 (3) - 1 f. Area of Kayl: loc. 66 (7) - 1 l.2.

Nop data: Our Valley, middle part: loc. 23 - 1 m. Known only from Luxembourg (Szeptycki & Weiner (1993) where it belongs to the commonest species of Protura (fig. 19). It was collected in all habitats, with the exception of synanthropic ones.

Eosentomon umbrosum Szeptycki, 2001

Deciduous forests: Garnich: loc. 57 (1) - 6 f., 1 m. Moselle Valley: loc. 62 (4) - 1 f.

Known only from Luxembourg (Szeptycki 2001) (fig. 9)

Eosentomon vulgare Szeptycki, 1984.

Deciduous forests: Our Valley, middle part: loc. 20 (1) - 1 f., 2 m. Area of Vogelsmühle: loc. 47 (1) - 7 f., 2 m., 3 mj, (2) - 1 f. Eisch Valley: loc. 54 (2) - 2 f., 2 m.

Coniferous forests: Our Valley, middle part: loc. 20 (2) - 1 m. Area of Baschleiden: loc. 36 (6) - 1 m. Eisch Valley: loc. 53 - 1 f., 1 m., 2 mj.

Petrophilous communities:

Area of Troisvierges: loc. 2 - 1 f., 3 mj.

Known from Poland (Szeptycki 1986), Germany (Alberti & all. 1989), Czech Republic (Rusek 1989) and Luxembourg. Collected mostly in the forests, rare (fig. 20)

Eosentomon weinerae Szeptycki, 2001

Deciduous forests: Garnich: loc. 56 - 1 l.2.

Mixed forests: Syre Valley: loc. 61 (5) - 1 f., 2 mj.

Coniferous forests: Eisch Valley: loc. 53 - 1 mj.

Meadows and similar open localities: Area of Baschleiden: loc. 37 (10) - 1 m., (11) - 1 f., (13) - 1 f.; loc. 40 (3) - 1 l.2.

Known only from Luxembourg (Szeptycki 2001) (fig. 17).

6 Discussion

The material described here has been sampled during the collecting of other groups of the soil invertebrates and the sample taken for it were

rather large. So the conclusions about the biology of individual Protura species can only be very general.

Between the taxa collected in Luxembourg one can distinguish a group of species distinctly more common in the forests than in the other habitat types. To this group belong: *Acerentomon affine*, *A. brevisetosum*, *A. gallicum*, *A. nemorale*, *Eosentomon funkei*, *E. mariae*, *E. silesiacum* and *E. silvaticum*.

In the studied fauna there were no common species connected with open habitats. Some of them seem to be common in all types of habitats - both forest and the open ones. They are: *Acerella remyi*, *Eosentomon armatum*, *E. delicatum* and *E. stompi*.

A very specific fauna was found in the town parks, gardens and similar anthropogenic localities. Some species, as *Acerentulus cunhai*, *Acerentulus* sp. A, and *Gracilentulus gracilis* are much more common in such habitat types than in other areas. Three rare species, *Proturentomon discretum*, *Berberentulus polonicus* and *Eosentomon luxembourgense* were only found in the town. On the other side, there is a group of species which seem to avoid the anthropogenic habitats - to this group belong *Acerentomon nemorale*, *A. brevisetosum*, *Acerella remyi* (rare in town), *Eosentomon silesiacum* and *E. stompi*.

Protura are so poorly known that only few words can be said about their geographical distribution. Within the species of the Luxembourg fauna there is a distinct group of Western European species which are not reaching Central Europe (or are restricted to its western part): *Protentomon barandiarani*, *Acerentomon affine*, *A. brevisetosum*, *A. nemorale* (in Central Europe - Czech Rep.), *A. gallicum* (in Poland - only western part), *Acerella remyi*, *Eosentomon sexsetosum* (in Poland - only western part), and - probably - *E. stompi*. It is possible, that some of the species (especially connected with anthropogenic habitats) are introduced (for example *Proturentomon discretum*,

Gracilentulus europeus and *Acerentulus cunhai*).

The most common species in the whole country are: *Acerentomon gallicum*, *A. affine*, *Eosentomon armatum*, *E. stompi*, *E. delicatum* and *E. bloszyki*. Some species are very common (and sometime numerous) only in the northern part of the country. To this group of species belong: *Acerentomon nemorale*, *Eosentomon mariae* and probably also *E. funkei* and *E. silesiacum*. On the other side - there are no common species of "southern" type of distribution.

Luxembourg is roughly divided into two major natural regions: the "Oesling", part of the Ardennes-Eifel chain, built by folded Devonian layers, in the northern part and the "Gutland", part of the north-eastern edge of the Paris Basin with Triassic and Jurassic layers in the southern part. As the former part (Oesling) has higher altitudes (up to 550 m) it is colder and receives more precipitations. The warmest and driest part of Luxembourg is the Moselle Valley with a mean annual temperature of more than 9° C and less than 750 mm of annual precipitations. The other extreme is the northwestern part of the Oesling plain with less than 8° C mean annual temperature and more than 900 mm annual precipitations. These climatic differences may explain certain patterns of distribution among the fauna.

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9 Appendix - Distribution maps

Fig. 3. The distribution of *Acerentomon affine*

Fig. 4. The distribution of *Acerentomon brevisetosum* and *Proturentomon discretum*

Fig. 5. The distribution of *Acerentomon gallicum* and *Acerentulus* sp. A

Fig. 6. The distribution of *Acerentomon nemorale* and *Ionescuellum ulmiacum*

Fig. 7. The distribution of *Acerella remyi* and *Najtentulus silvestris*

Fig. 8. The distribution of *Acerentulus cunhai* and *Eosentomon paucrum*

Fig. 9. The distribution of *Gracilentulus europaeus* and *Eosentomon umbrosum*

Fig. 10. The distribution of *Eosentomon armatum*

Fig. 11. The distribution of *Eosentomon bloszyki* and *Acerentulus silvanus*

Fig. 12. The distribution of *Eosentomon delicatum*

Fig. 13. The distribution of *Eosentomon funkei* and *Berberentulus polonicus*

Fig. 14. The distribution of *Eosentomon mariae* and *E. pastorale*

Fig. 15. The distribution of *Eosentomon sexsetosum* and *Protentomon barandiarani*

Fig. 16. The distribution of *Eosentomon silesiacum* and *Proturentomon* sp. A

Fig. 17. The distribution of *Eosentomon silvaticum* and *E. weinerae*

Fig. 18. The distribution of *Eosentomon stachi*

Fig. 19. The distribution of *Eosentomon stompi* and *E. luxembourgense*

Fig. 20. The distribution of *Eosentomon vulgare* and *Proturentomon minimum*

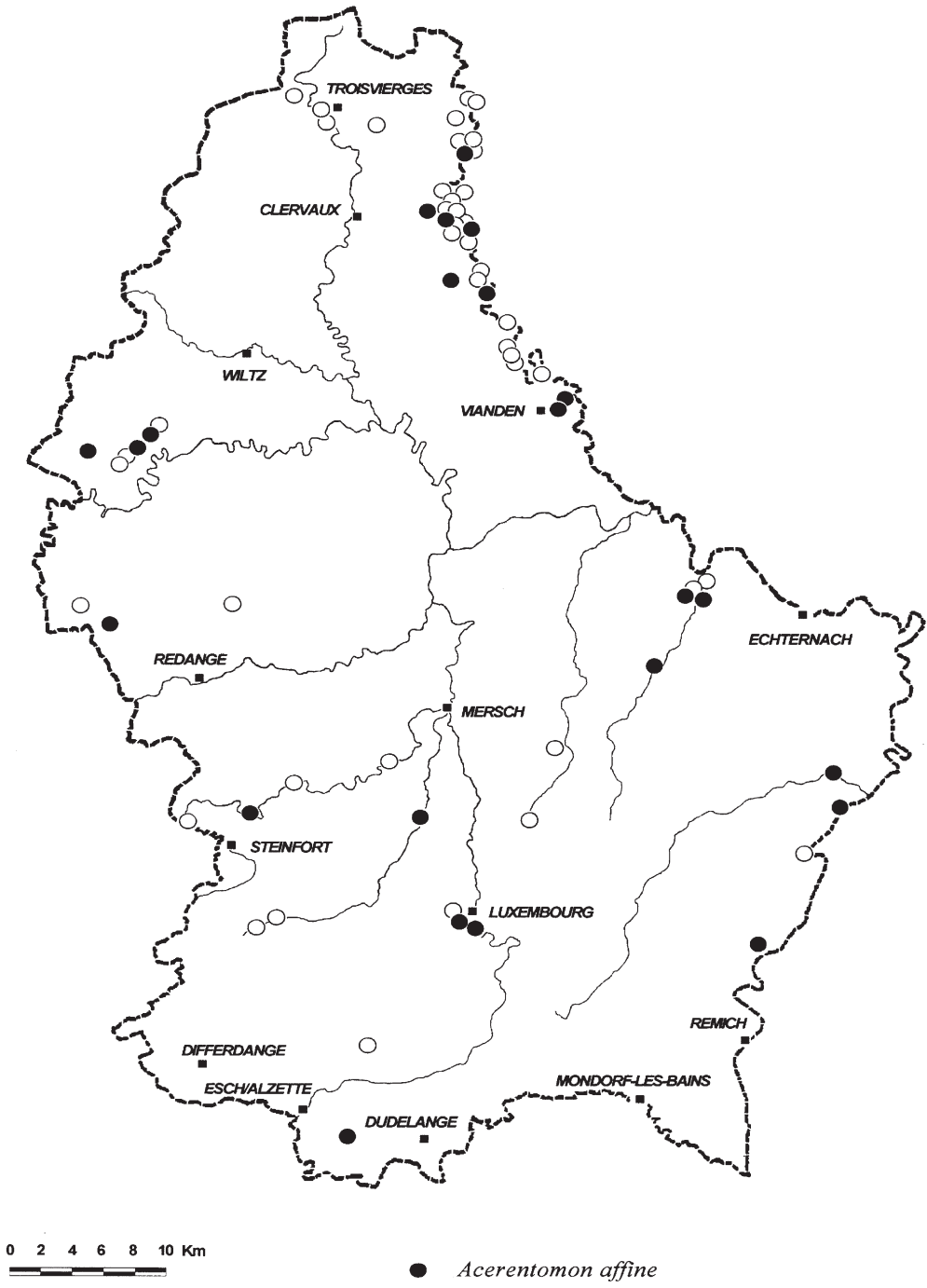


Fig. 3. The distribution of *Acerentomon affine* (empty circlets - other localities of the collecting of Protura)

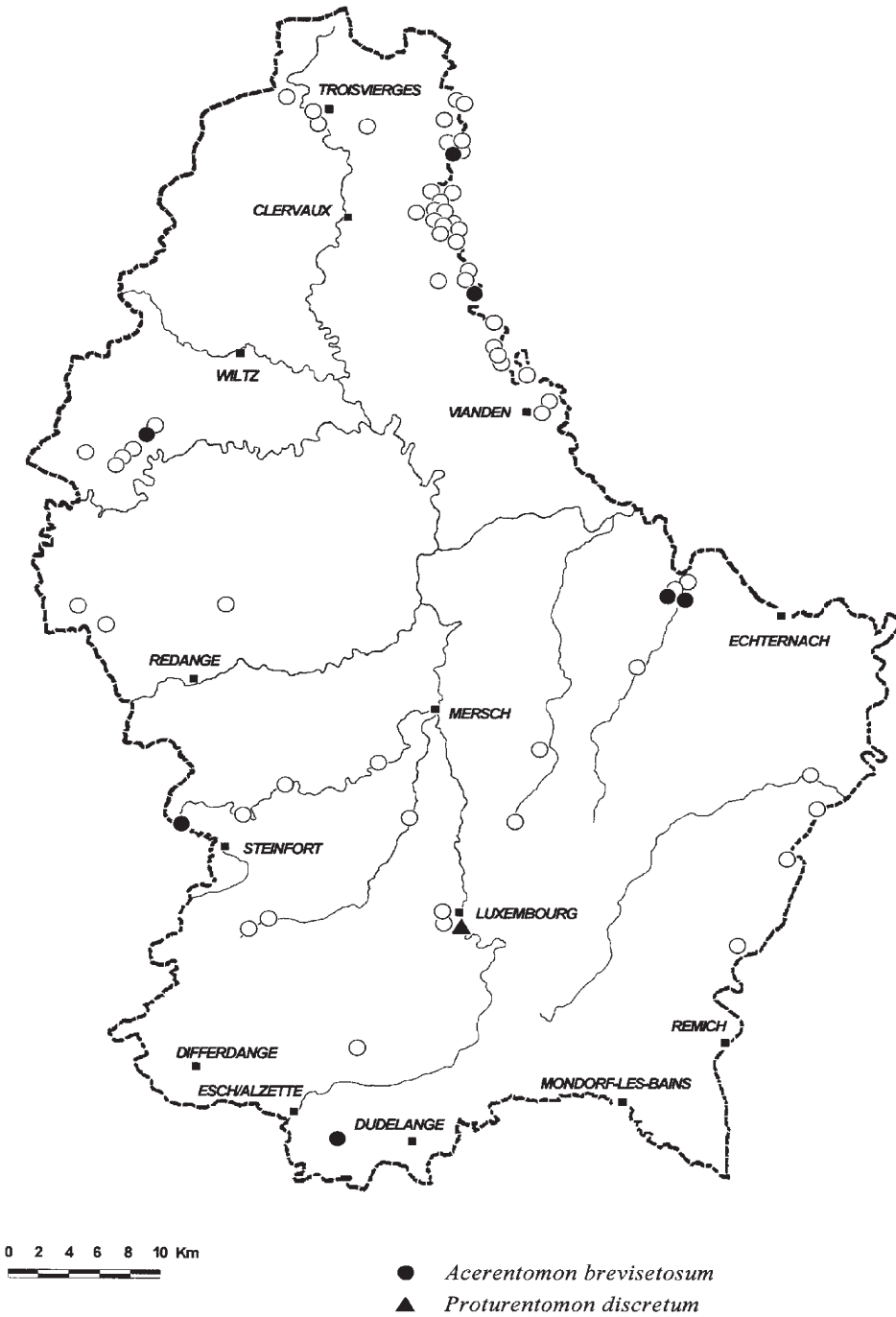


Fig. 4. The distribution of *Acerentomon brevisetosum* and *Proturentomon discretum* (empty circlets - as Fig. 3)

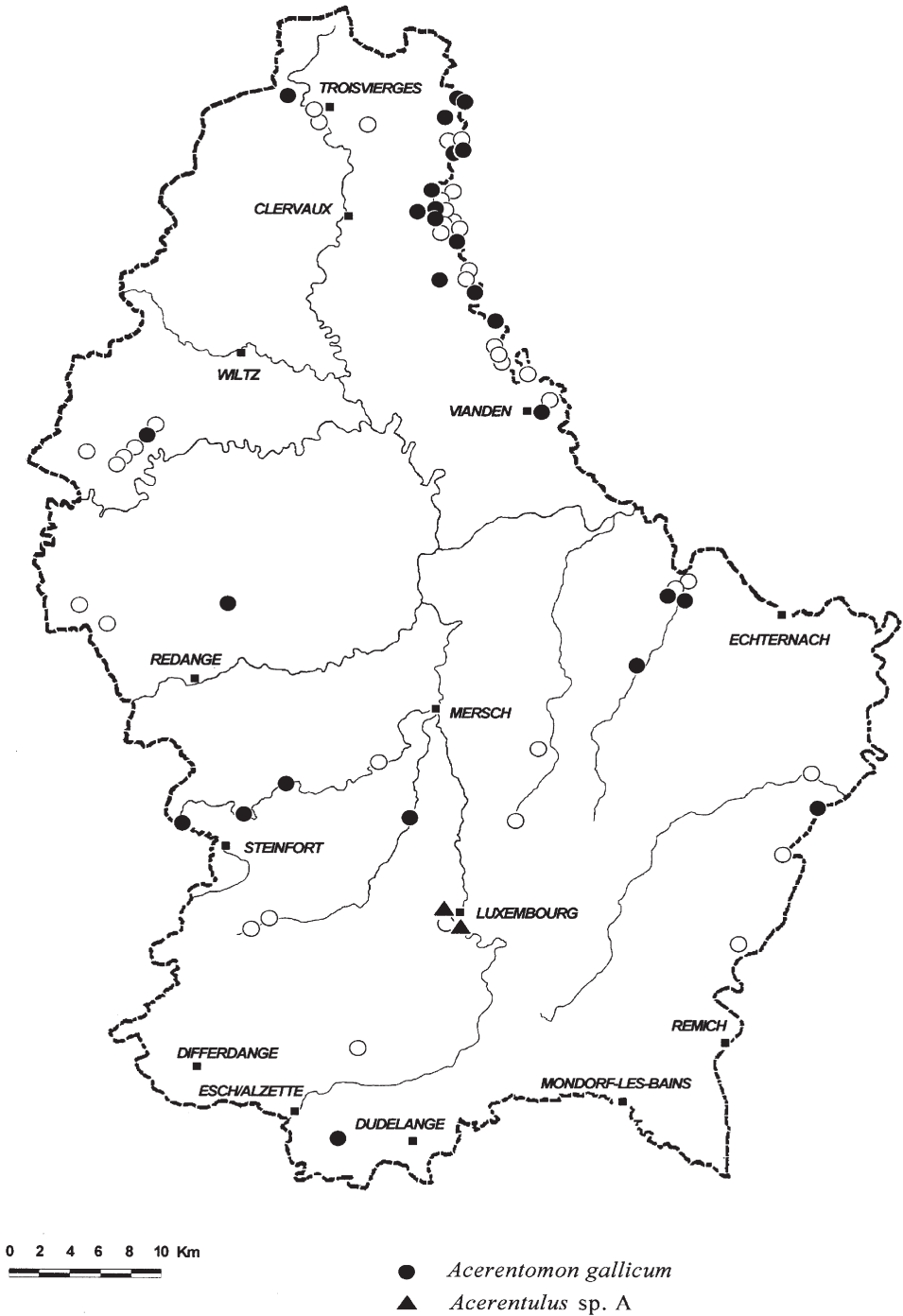


Fig. 5. The distribution of *Acerentomon gallicum* and *Acerentulus* sp. A (empty circlets - as Fig. 3)

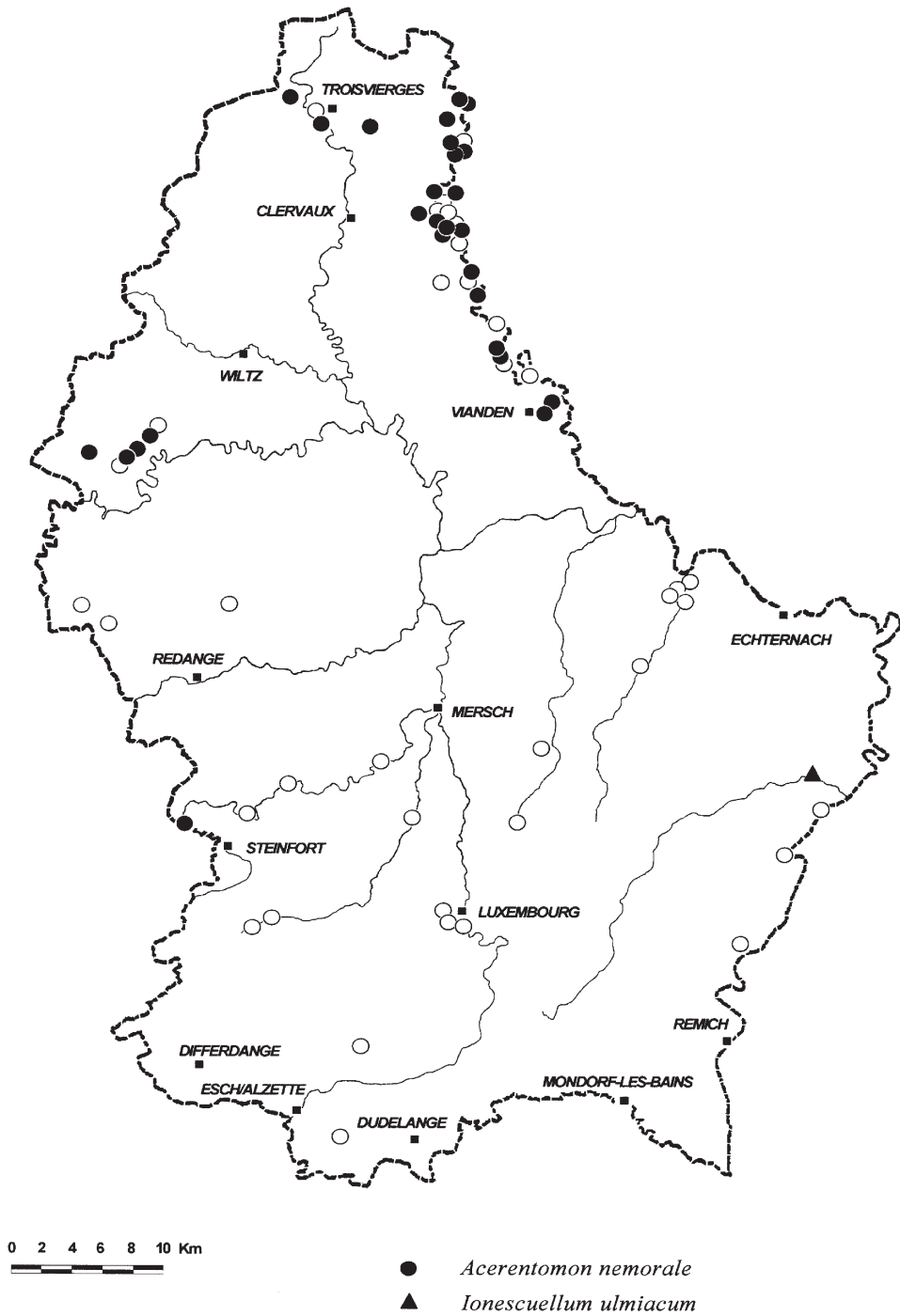


Fig. 6. The distribution of *Acerentomon nemorale* and *Ionescuellum ulmiacum* (empty circlets - as Fig. 3)

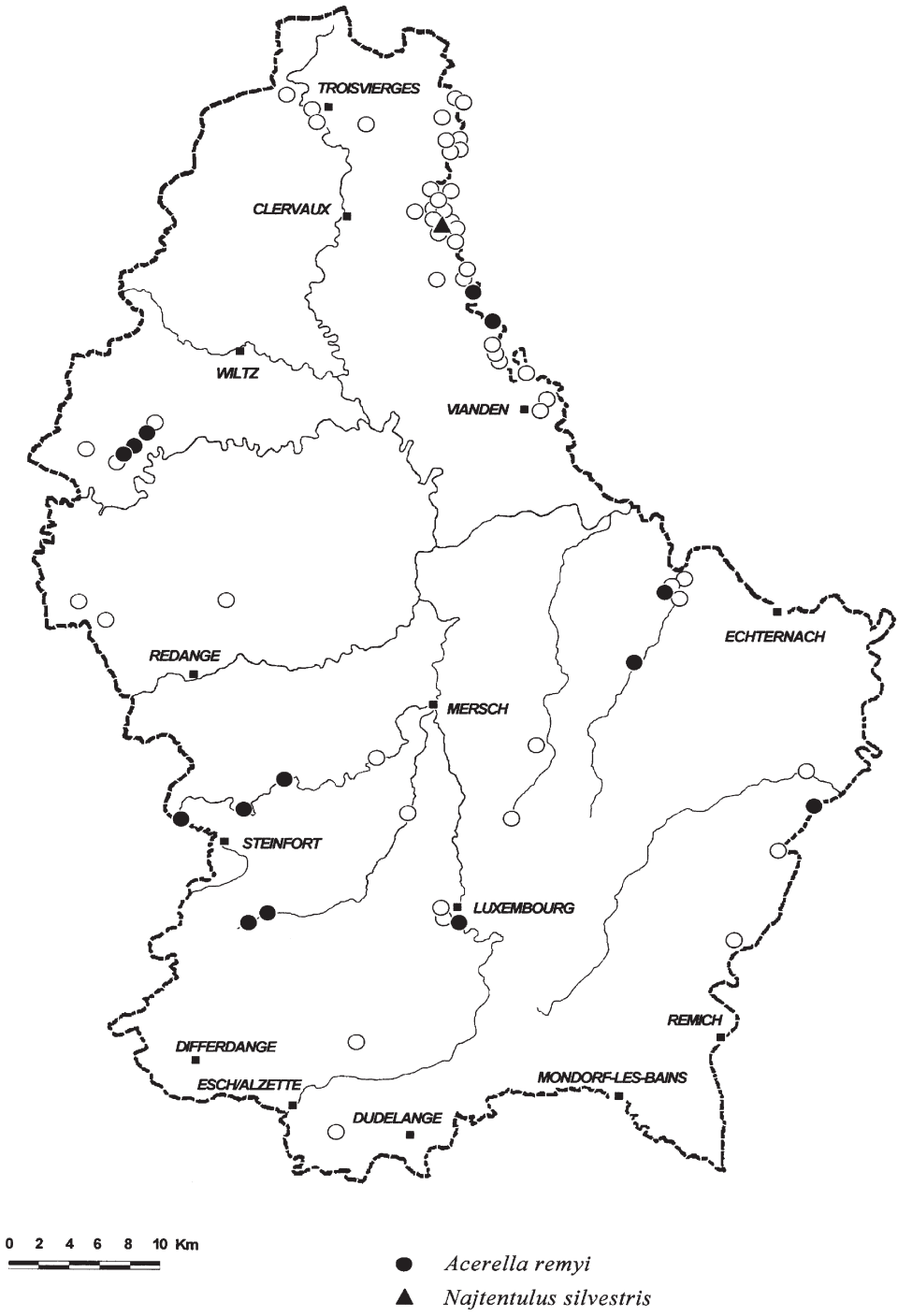


Fig. 7. The distribution of *Acerella remyi* and *Najtentulus silvestris* (empty circlets - as Fig. 3)

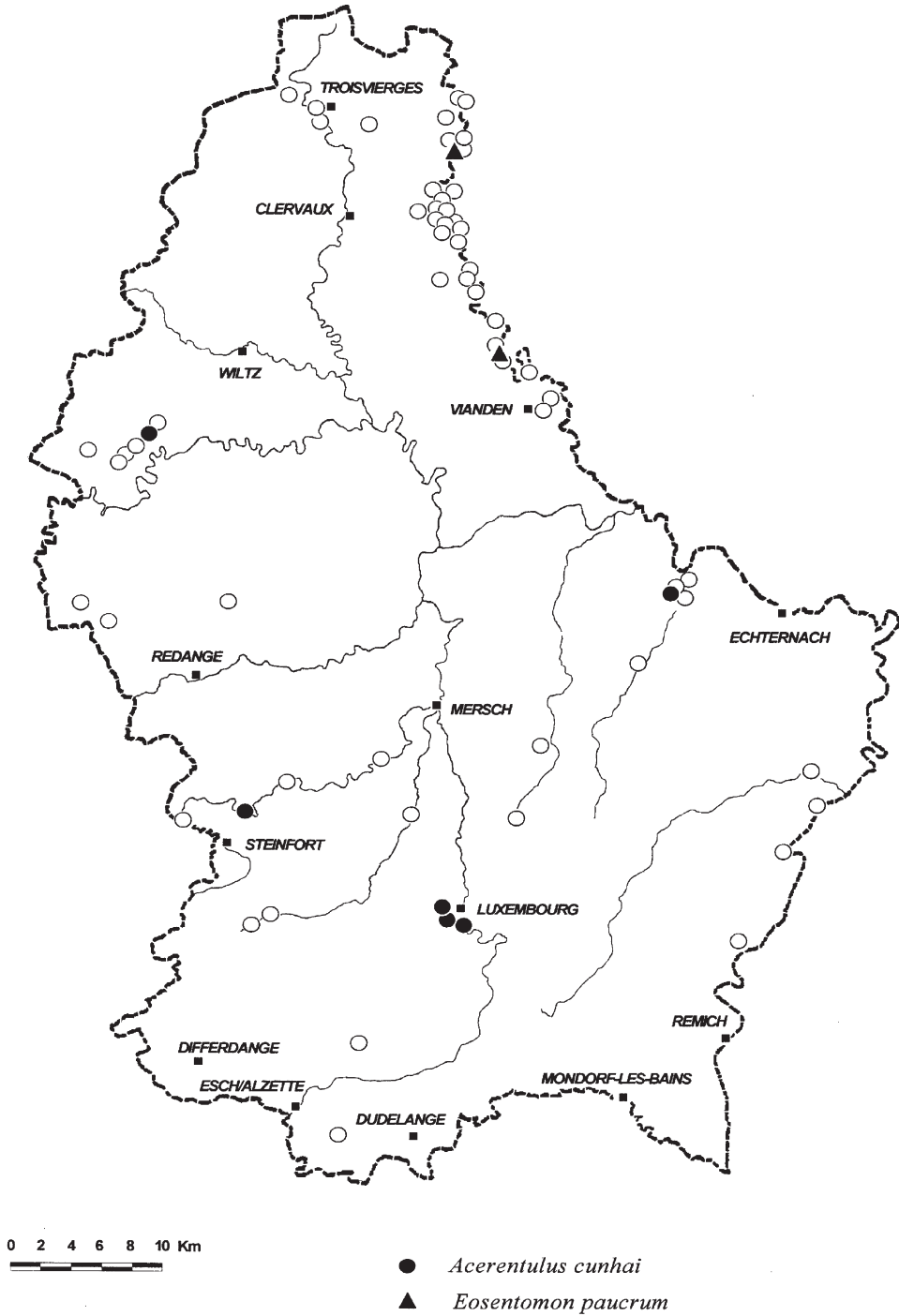


Fig. 8. The distribution of *Acerentulus cunhai* and *Eosentomon paucrum* (empty circlets - as Fig. 3)

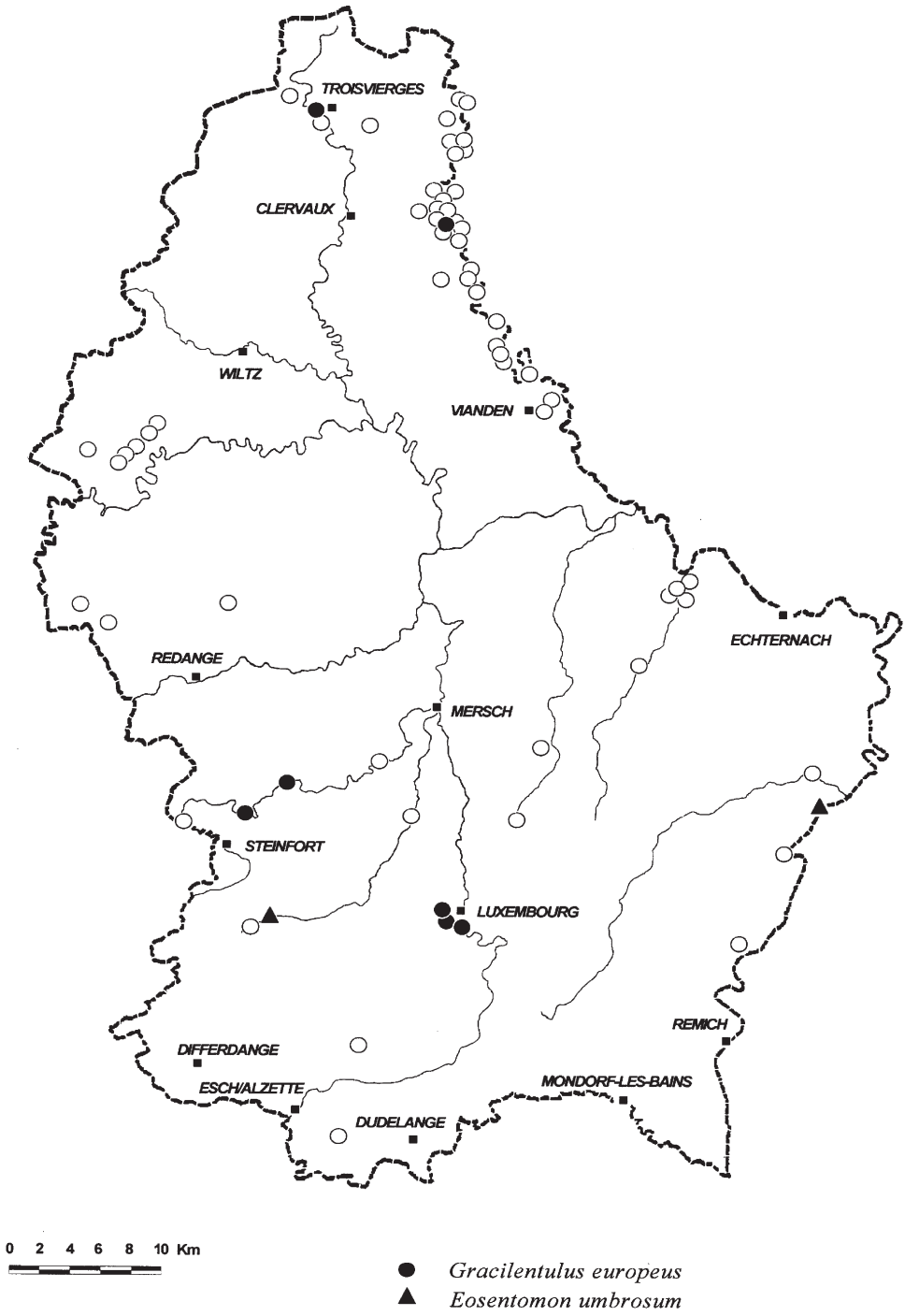


Fig. 9. The distribution of *Gracilentulus europaeus* and *Eosentomon umbrosum* (empty circlets - as Fig. 3)

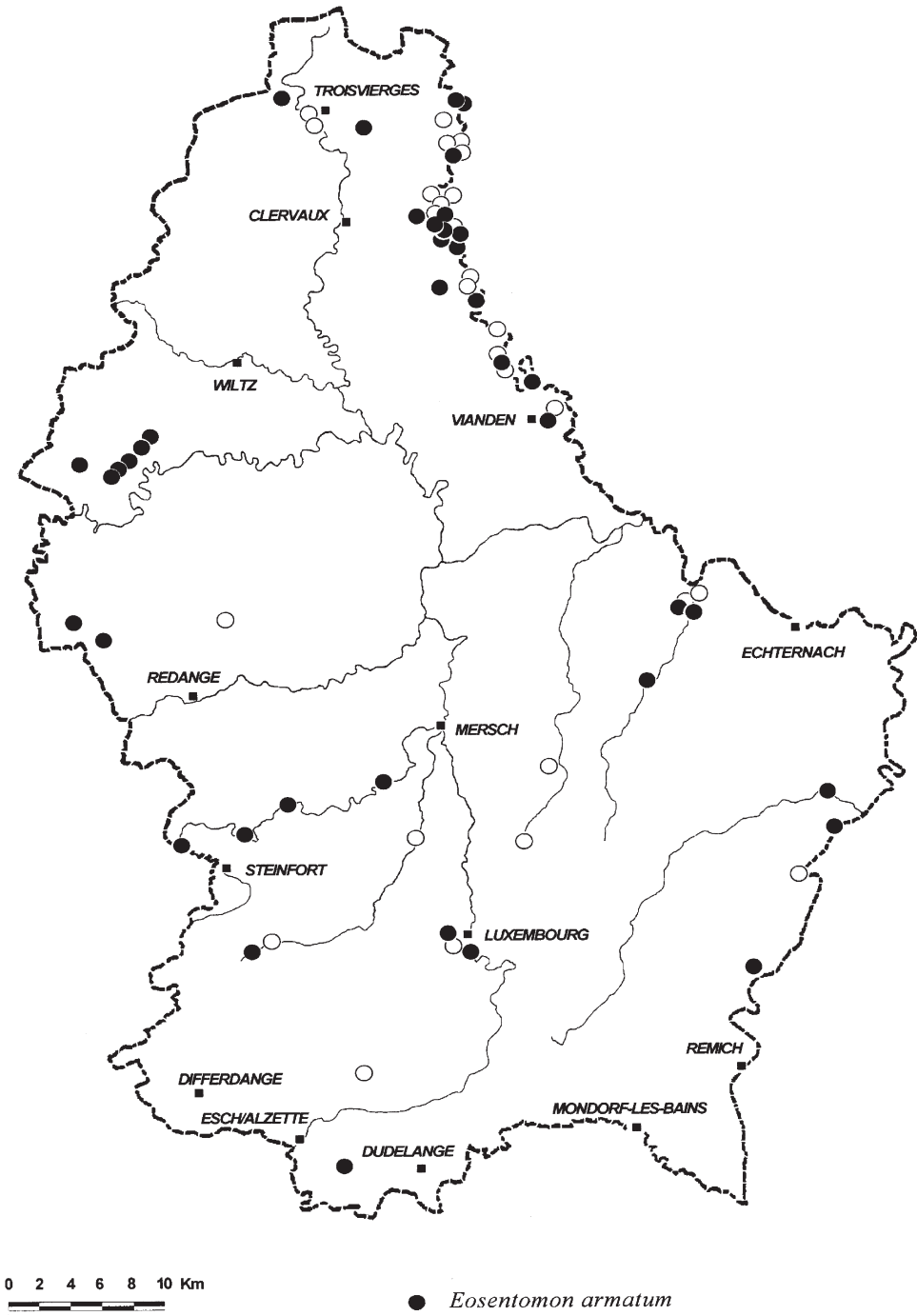


Fig. 10. The distribution of *Eosentomon armatum* (empty circlets - as Fig. 3)

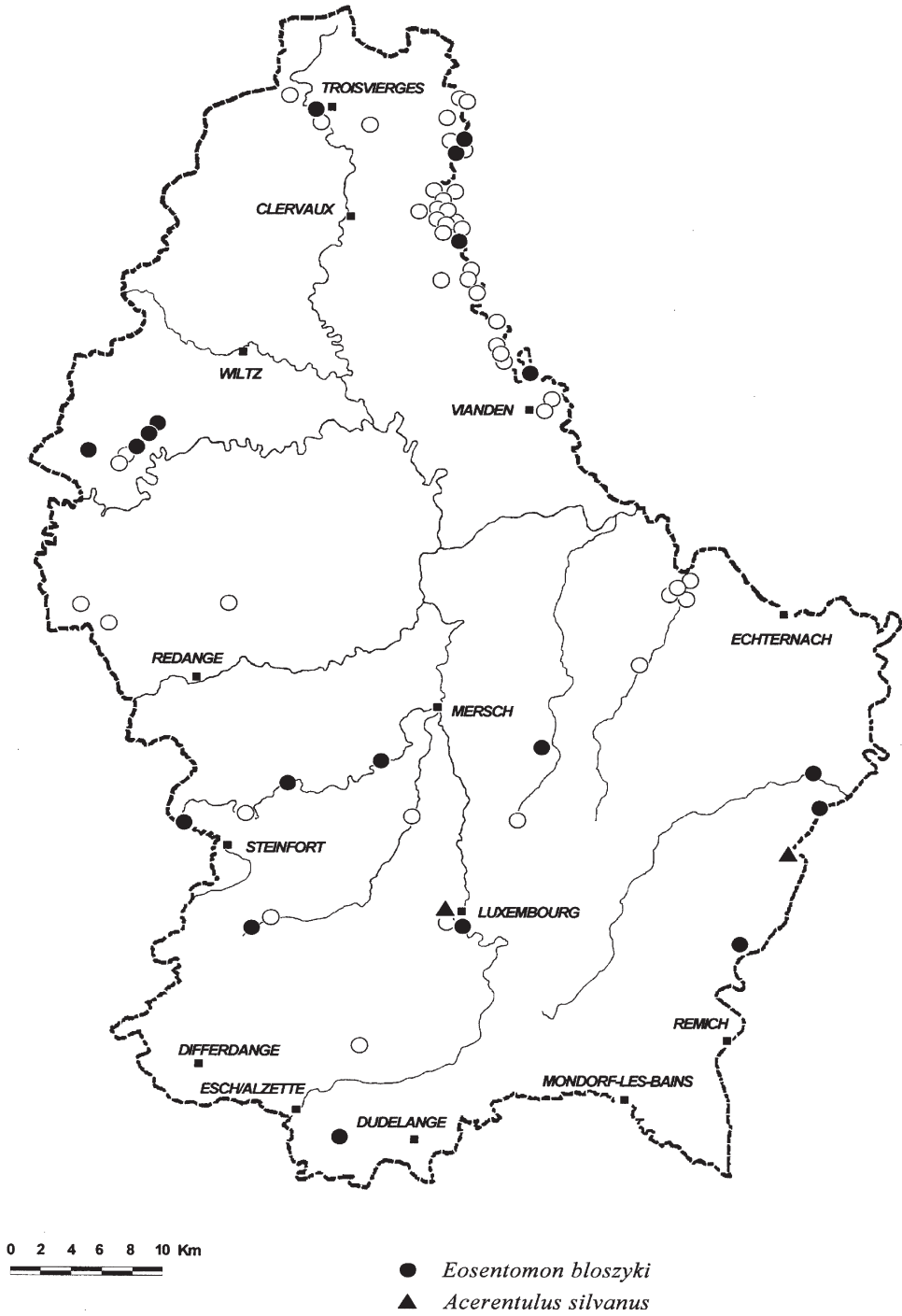


Fig. 11. The distribution of *Eosentomon bloszyki* and *Acerentulus silvanus* (empty circlets - as Fig. 3)

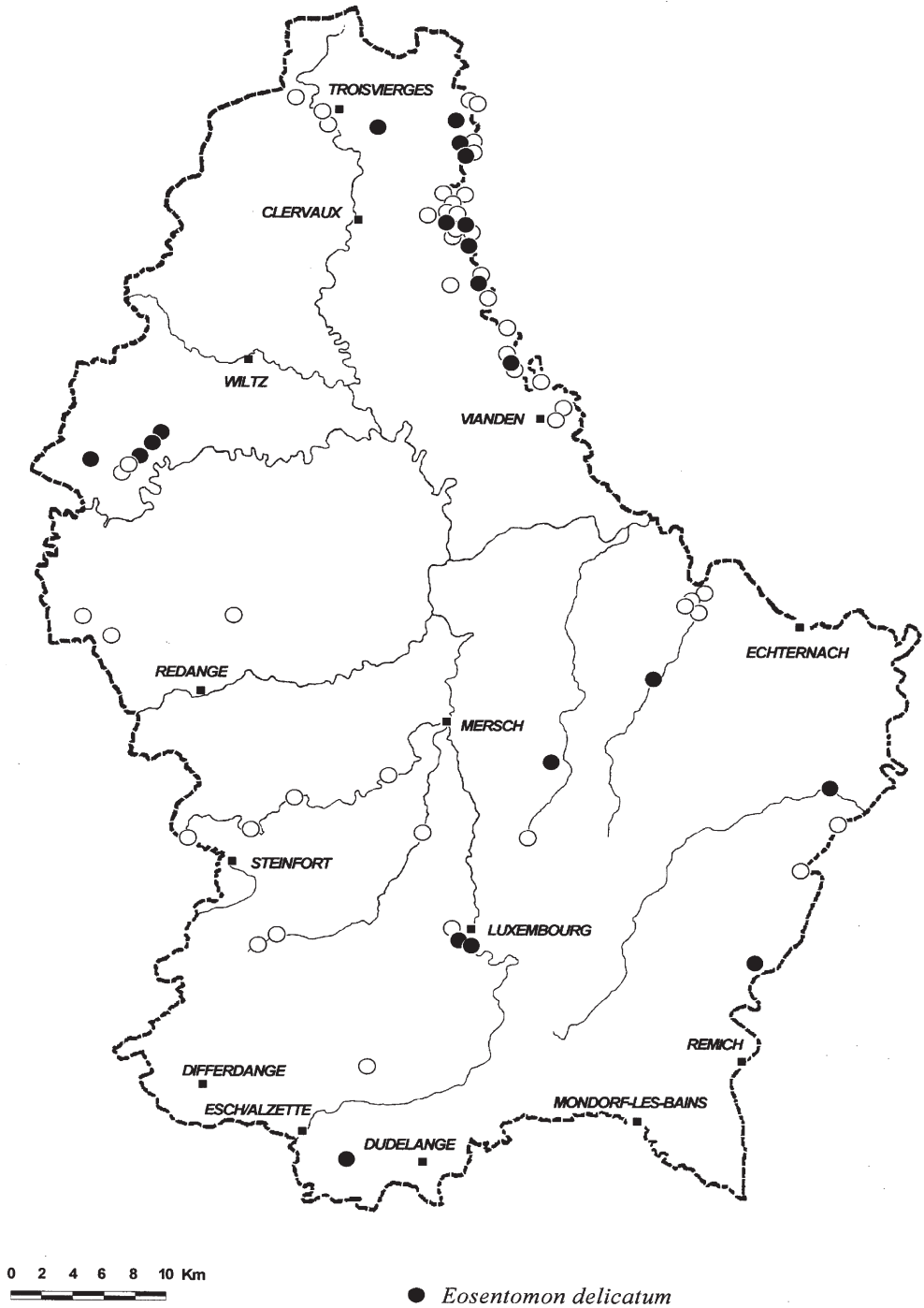


Fig. 12. The distribution of *Eosentomon delicatum* (empty circlets - as Fig. 3)

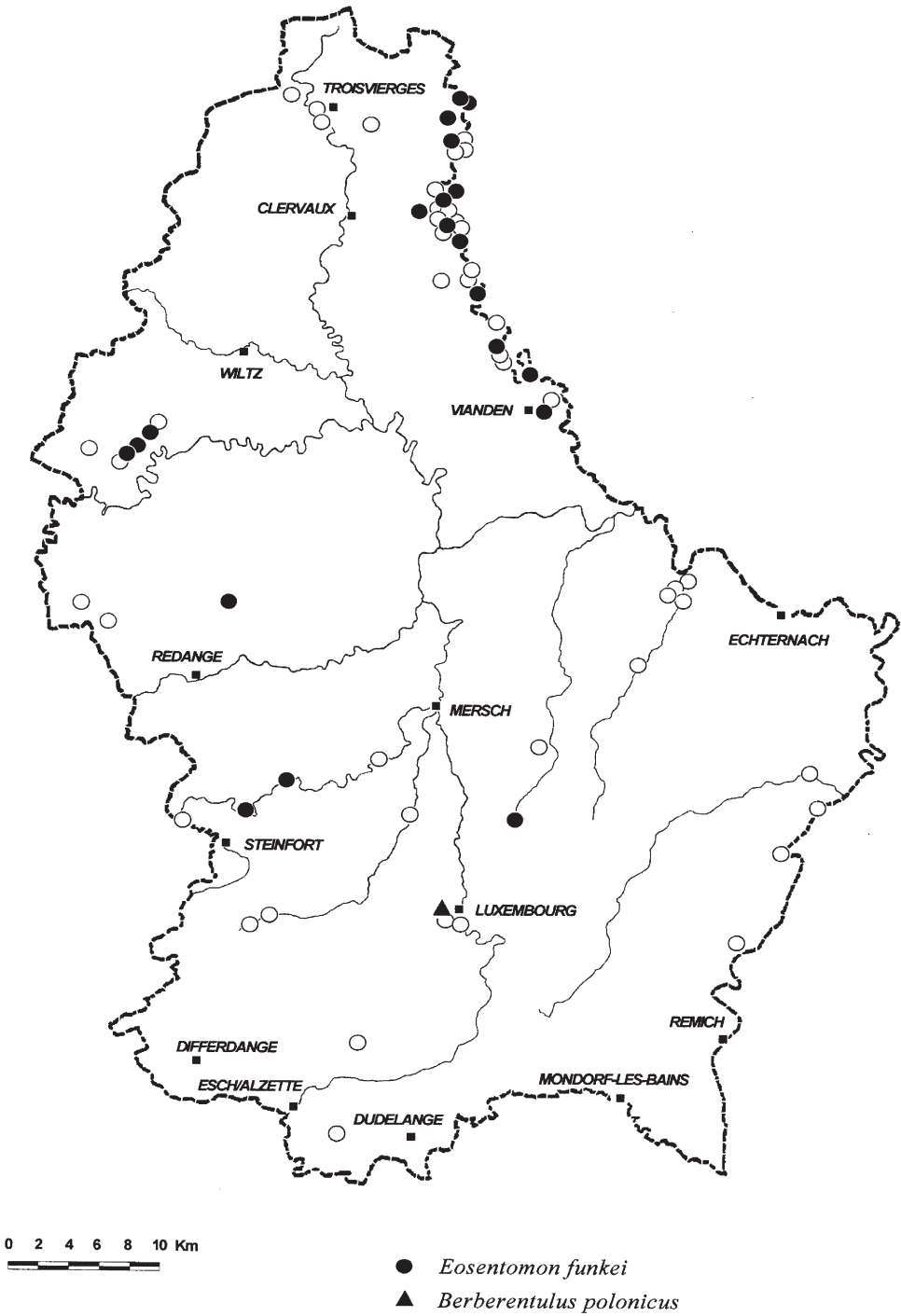


Fig. 13. The distribution of *Eosentomon funkei* and *Berberentulus polonicus* (empty circlets - as Fig. 3)

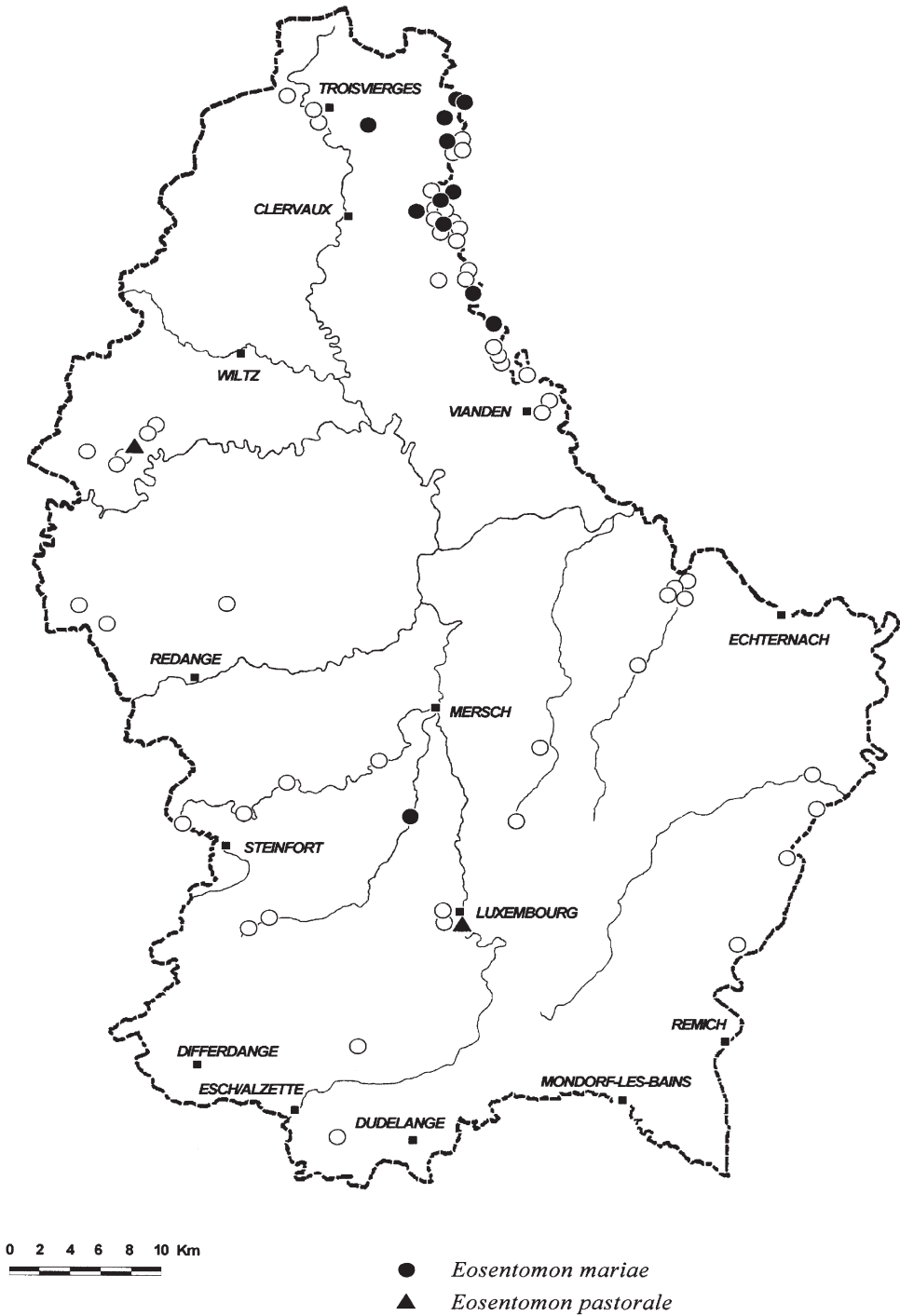


Fig. 14. The distribution of *Eosentomon mariae* and *E. pastorale* (empty circlets - as Fig. 3)

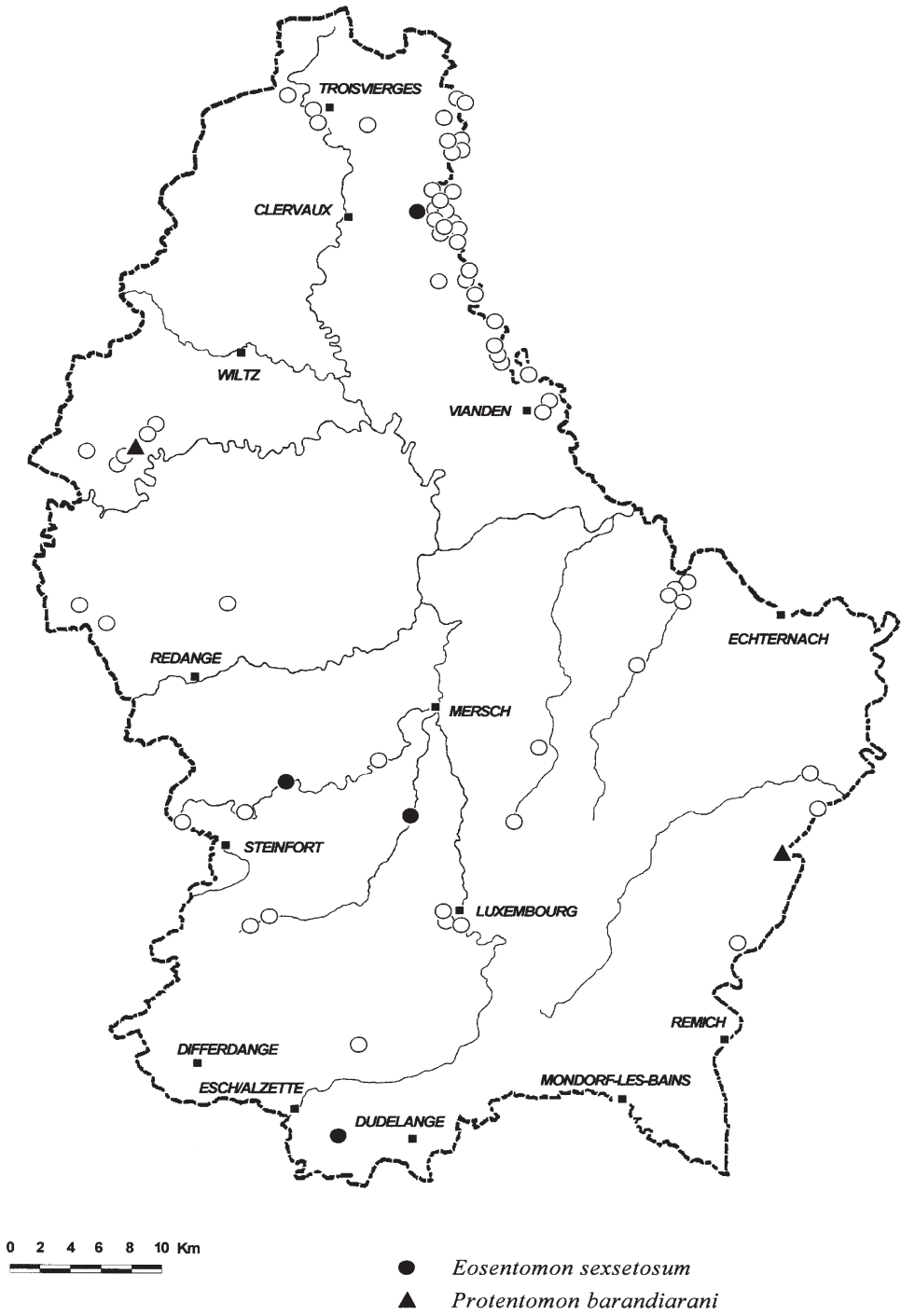


Fig. 15. The distribution of *Eosentomon sexsetosum* and *Protentomon barandiarani* (empty circlets - as Fig. 3)

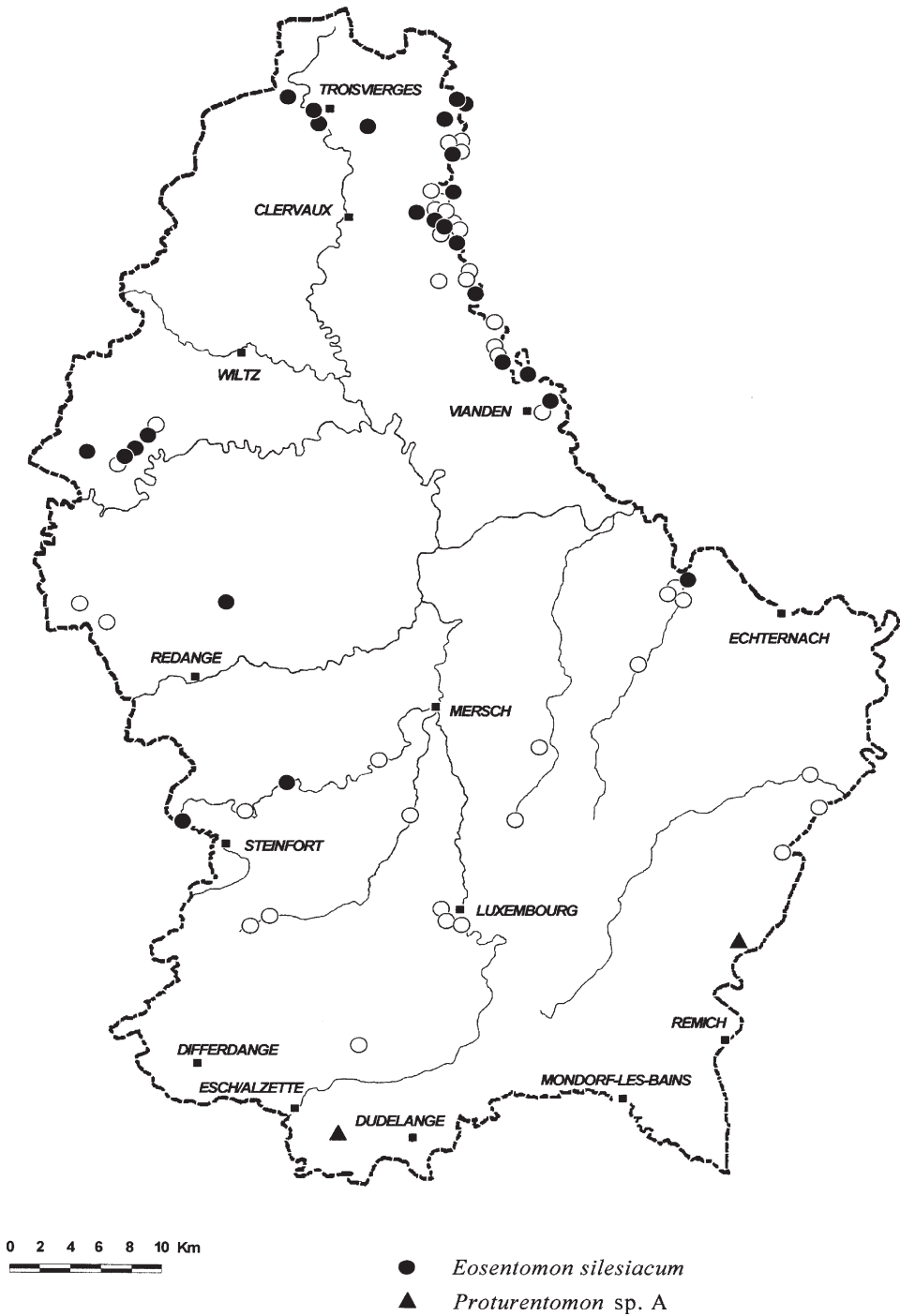


Fig. 16. The distribution of *Eosentomon silesiacum* and *Proturentomon* sp. A (empty circlets - as Fig. 3)

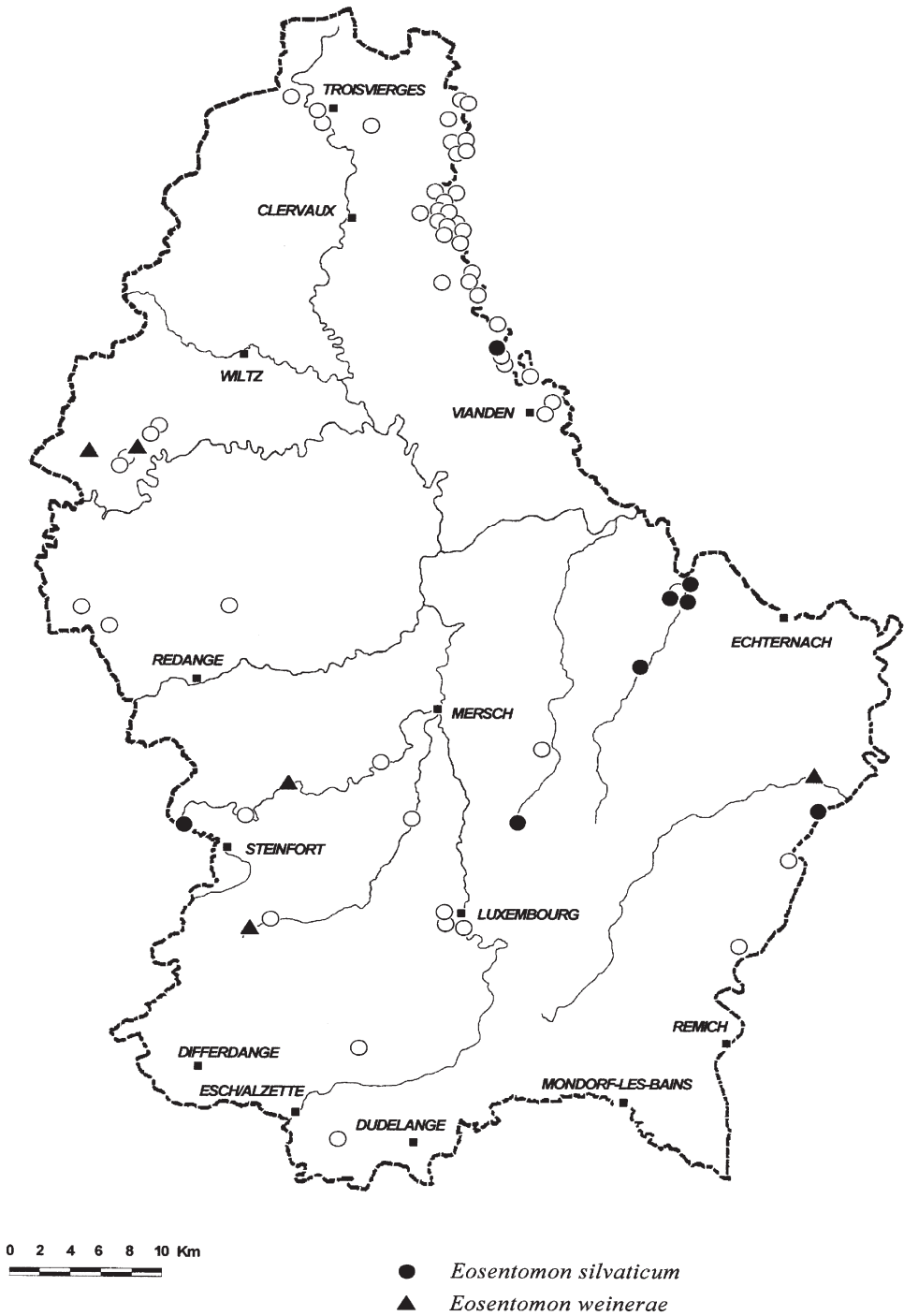


Fig. 17. The distribution of *Eosentomon silvaticum* and *E. weinerae* (empty circlets - as Fig. 3)

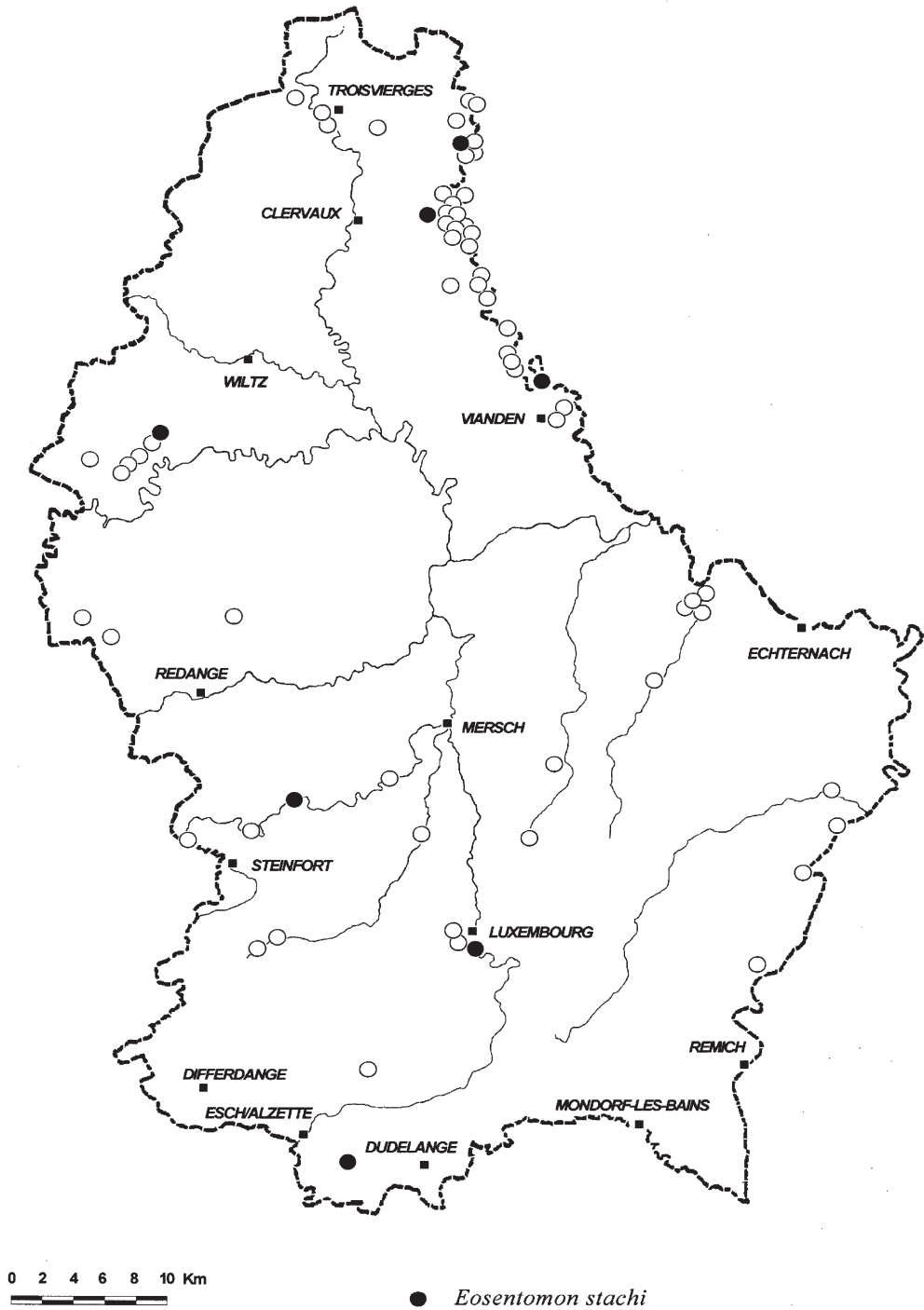


Fig. 18. The distribution of *Eosentomon stachi* (empty circles - as Fig. 3)

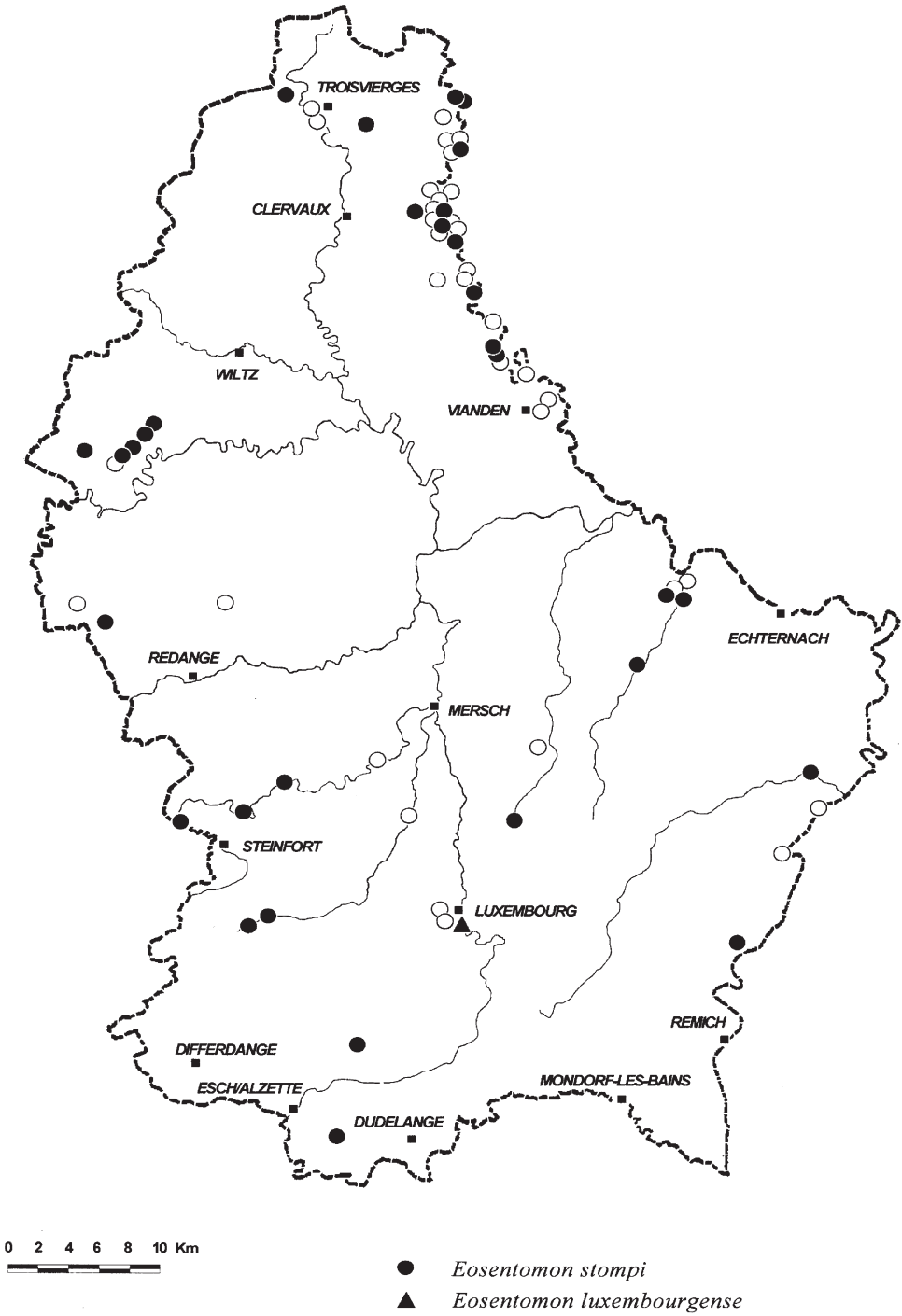


Fig. 19. The distribution of *Eosentomon stompi* and *E. luxembourgenae* (empty circlets - as Fig. 3)

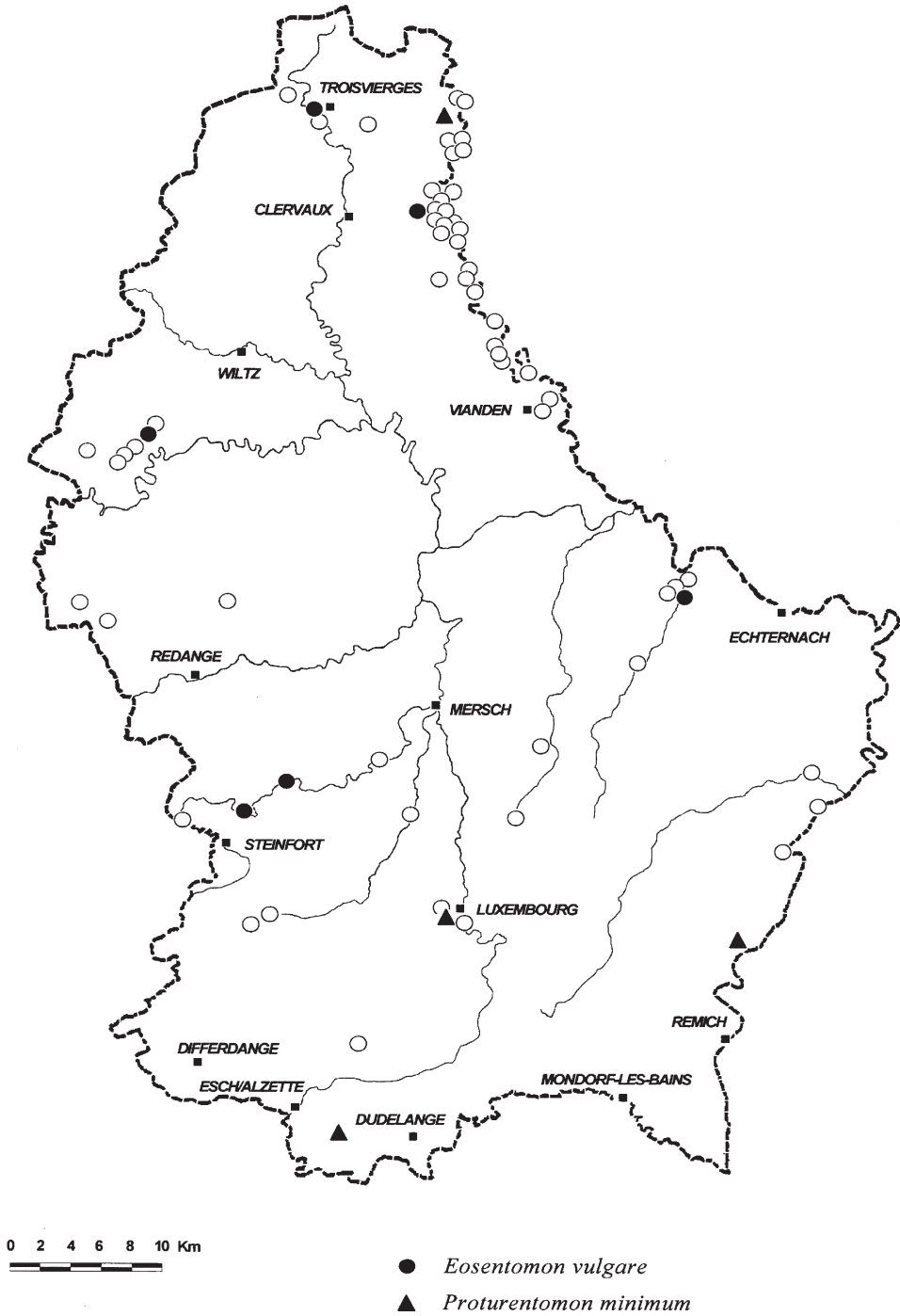


Fig. 20. The distribution of *Eosentomon vulgare* and *Proturentomon minimum* (empty circlets - as Fig. 3)

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Høeg J. T. & Lützen J. 1985. - Comparative morphology and phylogeny of the family Thompsoniidae (Cirripedia: Rhizocephala: Akentrogonida) with description of three new genera and seven new species. *Zoologica Scripta* 22: 363-386.

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