

- r. belge Ent.*, 121 (1-3): 63-65;
- MAGIS, N., 1986. - Apports à la chorologie des Hyménoptères Symphytes de Belgique et du Grand-Duché de Luxembourg IX. *Bull. Anns Soc. r. belge Ent.*, 122 (9-12): 262-264.
- MAGIS, N., 1988. - Apports à la chorologie des Hyménoptères Symphytes de Belgique et du Grand-Duché de Luxembourg XII. *Bull. Anns Soc. r. belge Ent.*, 124 (1-3): 34-39.
- MAGIS, N., 1994. - Répertoire des Mouches à scie reconnues en Belgique et au Grand-Duché de Luxembourg. (Hymenoptera: Symphyta). *Notes fauniques de Gembloux*, n° 28: 3-52.
- MARCHAL, J.L., 1985. - Résultats d'une enquête sur les Hyménoptères Symphytes de Hesbaye (Belgique). *Bull. Anns Soc. r. belge Ent.* 121 (9): 365-384.
- MUCHE, W.M., 1969. - Die Blattwespen Deutschlands II. Selandriinae (Hymenoptera). *Ent. Abh. Mus. Tierk. Dresden*, 36, Suppl.II: 61-96.
- PETIT, J., 1969. - Notes sur quelques Hyménoptères rares récoltés en Haute Belgique. *Lambillionea*, 67 (5-6): 54-58.
- SCHEDL, W., 1976. - Untersuchungen an Pflanzenwespen (Hymenoptera: Symphyta) in der subalpinen bis alpinen Stufe der zentrale Ötztaler Alpen (Tirol, Österreich). *Veröff. Univ. Innsbruck, (Alpin-Biol. Stud. N° VII)*, 103: 1-88.
- TAEGER, A., 1988. - Zweiter Beitrag zur Systematik der Blatt-wespengattung *Tenthredo* (s. str.). (Hymenoptera, Symphyta, Tenthredininae). *Beitr. Ent.*, 38 (1): 103-153.
- WOLF, F., 1966. - Données pour un atlas des Hyménoptères de l'Europe occidentale. V. Famille des Cimbicidae (Symphyta). *Bull. Rech. agron. Gembloux, N.S.*, 1 (2): 332-341.
- WOLF, F., 1967. - Hyménoptères Symphytes nouveaux pour la faune belge. *Bull. Anns Soc. r. ent. Belg.*, 103: 333-335.
- WOLF, F., 1968. - Données pour un atlas des Hyménoptères de l'Europe occidentale. VIII. Famille des Argidae (Symphyta). *Bull. Rech. agron. Gembloux, N.S.*, 3 (4): 763-775.

Carabid beetles new to or confirmed for the Belgian fauna (Col., Carabidae)

by Konjev DESENDER & Dirk MAES

Department Entomology, KBIN, Vautierstraat 29, B-1040 Brussel.

Summary

In this paper we report 15 species of carabids, new to or confirmed for the Belgian fauna, obtained either through recent sampling or through re-examination of old museum collections.

*A recently started ecological study of the woodland 'Bos t'Ename' in the southern part of eastern Flanders has revealed the presence of *Dromius bifasciatus*, a carabid beetle which appears to be new for the Belgian fauna. Our current knowledge of this beetle is given in this paper.*

Recent research in the context of establishing a documented Red list of carabids in Flanders has encouraged us to check and/or identify some very old collections from the Royal Belgian entomological Society. These collections are housed in the Royal Belgian Institute for Natural Sciences in Brussels but apparently part of it was never checked by us nor by previous Belgian carabidologists.

Although these data mainly concern old to very old observations they enabled us to add 15 more species to the checklist of ground and tiger beetles of Belgium, several of which have never been reported before or were not yet accepted due to the lack of reference material. This increases the number of our ground and tiger beetle species to a total of 401. Several of these additional species however have not been captured during recent decades or not even during this century and therefore probably have to be considered as extinct. A number of species can be interpreted as accidental immigrants into our country. For other species we have reasons to believe they once occurred in reproducing populations, but disappeared most probably through habitat destruction or deterioration.

Introduction

We have been sampling the woodland 'Bos t'Ename' (Ename, eastern Flanders) since March 1994 for its spiders and carabid beetles. This study is part of a larger project on spiders and insects of this woodland area. The study site is famous for its flora, extremely well documented with respect to its historical ecology, but has never been studied with regard to its terrestrial arthropods. Our main goals in the study of carabid beetles from the area are threefold: (1) a descriptive ecological study of the species assemblages encountered in different habitats with particular interest for the influence of management practices as well as an evaluation of the faunistic values, (2) the study of the influence of the historical ecology and size of different parts of the area on the observed beetle communities and (3) a population genetic study of some selected species in conjunction with the historical and landscape ecological setting.

The first sampling series has already revealed a specimen of a carabid beetle previously unknown to the Belgian fauna. Although no further individuals have been found to date, our identification was quite conclusive and we therefore report this capture.

On the other hand, we have recently established a documented Red list of the ground and tiger beetles of the Flemish region (DESENDER *et al.*, in press), supported by an external study assignment from the Institute for Nature Conservation of the Flemish Community. This project stimulated us to carefully check some old collections of beetles, enabling us to add no fewer than 14 more species to our most recent update of the Belgian fauna (DESENDER, 1995). These additional collections had not previously been checked by us, were even unknown to us, or apparently had not even been checked by any other Belgian carabidologist.

Material

Pitfall traps are continuously in operation in many sampling stations of 'Bos t'Ename' since March 1994. The traps are emptied and sorted at fortnightly intervals, a procedure to be continued for at least one complete year cycle. The carabid beetle data presented here are preliminary as only a small part of our material from 'Bos t'Ename' has already been identified.

Additional collections verified in the context of establishing the mentioned documented Red list included the general reference collection of the Royal Belgian entomological Society as well as two additional collections from the same entomological society, i.e. the collection GUILLEAUME and the collection JACOBS, which dates back to the 1850s. All these collections are housed in the Royal Belgian Institute for Natural Sciences.

All data given here are based on specimens identified or checked by the first author. The nomenclature follows DESENDER (1995) and FREUDE *et al.* (1976) for those species not previously reported for Belgium.

Results and discussion

1. *Dromius bifasciatus* DEJEAN, 1825 Belg. n. sp.

This carabid beetle species had already been mentioned for our country by FAGEL (1937) but the single specimen he reported was not traceable until we recently rediscovered this particular specimen by a fortunate coincidence. This specimen appeared to have been misidentified and to belong to another species, *Dromius quadrisignatus*. This identification, in turn, makes it the first confirmation of *Dromius quadrisignatus* in our country (see further).

One female, indeed belonging to *Dromius bifasciatus*, was caught in a pitfall trap between 13 and 30 April 1994 in the 'Grottenbos' of 'Bos t'Ename'. The trap was located in a rather humid mixed deciduous woodland of oak and ash with some large poplars (old varieties), an undergrowth mainly composed of *Rubus* sp. and a well developed litter layer.

FREUDE *et al.* (1976) mention 3 to 3.5 mm as total length of *Dromius bifasciatus*. They also provide a figure of the bicoloured elytron (p. 274, 14), the pattern of which enables a discrimination between this species and the very closely related *Dromius spilotus* (ILLIGER, 1798) (synonym of *Dromius quadrinotatus* (PANZER, 1801)). *Dromius bifasciatus* also seems, to our opinion, to possess relatively broader elytra as compared to *Dromius spilotus*. Both species are the only European members of the subgenus *Calodromius* REITTER, 1905.

According to FREUDE *et al.* (1976) *Dromius bifasciatus* occurs in western and southeastern Europe. However, they question its presence in central Europe notwithstanding its occurrence in Alsace. *Dromius bifasciatus* is not known for the British Isles (LINDROTH, 1974) and with respect to neighbouring countries, has only been mentioned for France (mostly in the west, very rarely in the north (BONADONA, 1971; JEANNEL, 1942)). TRAUTNER & GEIGENMÜLLER (1987) mention the species for southern and western Europe.

Dromius bifasciatus probably has, like its sister species *Dromius spilotus*, a rather special biology. It is most likely also a carnivorous tree-dweller, living in the crevices and under bark of old or dead deciduous trees or between branches on the soil surface. Consequently such species, in theory, should find better conditions for living in natural woodlands, in which dead or dying trees are not removed. This more or less arboricolous way of life contrasts with that of most other carabid species which are well known ground dwellers. These *Dromius* species are therefore only rarely caught in pitfall traps or at most in low numbers. This, in its turn, means that they might easily be left undiscovered in a forest, if sampling is not intensive and/or does not include regular searching of trees or trunks.

Dromius spilotus nevertheless is rather well represented in many collections, at least in the Belgian collection of our institute. It also occurs in

'Bos t'Ename' both at the sampling station of *Dromius bifasciatus* and elsewhere (preliminary data). A quick revision of all presumed '*Dromius spilotus*' specimens from the collection of the Institute as well as carabids from other woodland areas that we have formerly identified did not reveal any additional specimens of *Dromius bifasciatus*.

At the time being we are left somewhat in doubt about the actual and former occurrence of *Dromius bifasciatus* in our country, the surroundings of 'Bos t'Ename' and the southern part of eastern Flanders in general not having been prospected much in earlier days. At the best the species is thus rare or extremely rare in our country. The presumed habitat preference of this species, in conjunction with the history and surface of 'Bos t'Ename', anyway makes the existence of (a) (small?) population(s) probable, but more data are needed. There is also the possibility that this species has only recently invaded our country as a result of recent climatological changes (warming up) and/or that we have been dealing with a vagrant individual. The specimen, a female, was, although macropterous, not in the possession of functional flight musculature and did not carry ripening or ripe eggs. However, in view of the presumed arboricolous way of life (cfr. DESENDER, 1989) and the date of capture, neither feature is surprising, even for a specimen in a reproducing population. In conclusion, at the moment we are inclined to reject the hypothesis of a single vagrant specimen in this area, but we will have to await additional findings to corroborate this idea.

2. Other carabid beetles new or confirmed for the Belgian fauna

Below we will deal with all other species which have been added in the most recent checklist of carabid species in Belgium (DESENDER, 1995, being an elaborated update together with some nomenclature modifications of DESENDER, 1985, 1987, 1990, 1992).

These additional species are grouped in

- (A) those never mentioned before or misidentified as such (3 species) and
- (B) those already mentioned in some old publications on Belgian carabids (11 species), but of which specimens so far could not be traced by us in the collections of different institutes and collectors. In the Belgian checklist (DESENDER, 1985) these species were reported with a question mark. Traceable reference material was indeed our prerequisite for the acceptance of a species as belonging to our fauna.

Within both of these groups, species are reported in alphabetic order.

(A1) *Dromius quadrisignatus* DEJEAN, 1825 Belg. n. sp.

One specimen (leg. G. FAGEL, see also FAGEL (1937), formerly misidentified as *Dromius bifasciatus* (see above)), in the collection GUILLEAUME: Bas-Oha (UTM: FR59), 17-26.VII.1937.

Already mentioned by MATHIEU (1857) from several localities and reported by DERENNE (1957) as being common (?!?) in woodland; surprisingly not a single reference specimen could ever be traced by us; possibly the species has been confused with the related and rather variable species *Dromius spilotus*. *Dromius quadrisignatus* occurs in southern and central parts of western Europe as far as the British Isles (FREUDE *et al.*, 1976). It has also been caught on few occasions in the Netherlands, in the west and south. Consequently, according to BOEKEN (1987), it is a rare species, living on trees and between dead branches on the soil surface.

(A2) *Drypta distincta* (ROSSI, 1792) Belg. n. sp.

One specimen (leg. ?) in the collection JACOBS: Rochefort (FR56), 1859.

This species shows a southern distribution pattern and mainly occurs in the Mediterranean region (BONADONA, 1971). Most probably this single capture concerned a vagrant specimen.

(A3) *Nebria picicornis* (FABRICIUS, 1801) Belg. n. sp.

One specimen (leg. ?) in the collection JACOBS: Stavelot (GR08), 9.V.1858.

According to FREUDE *et al.* (1976) a montane and subalpine species occurring from central Europe to the Caucasus, most common near running water. Again, most probably this single capture concerned a vagrant specimen.

(B1) *Aepus marinus* (STROEM, 1788)

One specimen (leg. ?) in the collection JACOBS: Oostende (DS97), 15.VIII.1865.

This species had already been reported by MATHIEU (1857) for Antwerpen and Nieuwpoort, but until now without the evidence of reference material. It is a very small, flat, apterous and unpigmented beetle adapted for subterranean life in the tidal zone, living on rocky seashores or man-made stony constructions (like break-waters) in the intertidal zone, under stones and in crevices. It has been reported from the British Isles (LINDROTH, 1974), Ireland, Norway, Brittany and Normandy in France (FREUDE *et al.*, 1976) and apparently must have been relatively common along the Belgian coast and the Sea Scheldt in the previous century. Now the species is probably extinct in our country.

(B2) *Amara ingenua* (DUFTSCHMID, 1812)

One specimen (leg. DHAENS) in the collection GUILLEAUME: Spa (GR09), V.1934.

Already reported by DERENNE (1957), but until now we had not been able to trace reference material. Three of the four observations reported by DERENNE (1957) to our opinion concern *Amara consularis* (DUFTSCHMID,

1812). *Amara ingenua* occurs in central Europe, especially in northern and eastern parts. According to FREUDE *et al.* (1976) it prefers ruderal sites on sandy soil. Only one observation from the Netherlands (Drente) (BOEKEN, 1987). In view of the locality where the above-mentioned single individual was collected, it was most probably a vagrant specimen.

(B3) *Bembidion fasciolatum* (DUFTSCHMID, 1812)

Two specimens (leg. ?) in the collection JACOBS: Spa (GR09), 7.IX.1875 and Dinant (FR36), 4.IX.1879.

This species was already mentioned for our country but all specimens reported by DERENNE (1957) appeared to belong to other sibling species (a.o. *Bembidion ascendens*) or could not be traced. *Bembidion fasciolatum* apparently is a stenotopic montane species from river banks in the Pyrenees and central Europe (FREUDE *et al.*, 1976). If it has ever been present in reproducing populations in Belgium, which is difficult to ascertain, it could have become extinct in our country, at least partly by the destruction of its habitat (for example the nearly complete disappearance of natural river banks along the river Meuse) or by deterioration (pollution) of its environment.

(B4) *Bembidion saxatile* GYLLENHAL, 1827

One specimen (leg. G. FAGEL) in the collection GUILLEAUME: Antwerpen (linkeroever) (ES97), 10.VI.1935.

This species was reported by DERENNE & FAGEL (1936), but we had not yet been able to trace the single specimen they referred to. NETOLITZKY & MEYER (1937) called its presence in our country very improbable. DERENNE (1957) mentioned the species from other localities (along the river Meuse, at Leuven and Mons) based on data from MATHIEU (1857). In view of the lack of reference material for these sites, the difficult identification of this species and its probable habitat preference (see further), we presently do not accept these findings. FREUDE *et al.* (1976) and LOHSE & LUCHT (1989) mention the occurrence in Europe, except for western and southern parts. They classify *Bembidion saxatile* as littoral, but not halobionth. This could well explain its former occurrence in (a) population(s) on brackish marshes (oligohaline) near Antwerp. Recently we started to investigate salt and brackish marshes along a detailed transect of the river Scheldt for their ground beetle fauna, but we could not yet find this species (cfr. DESENDER & MAELFAIT, in press). Most probably it represents another case of a rare species, which is extinct now. Although climatic changes could have been involved in its disappearance, it is also a well known fact that the water quality of the river Scheldt has become very poor in recent decades and this could also have been responsible for its decline and extinction.

(B5) *Carabus nodulosus* CREUTZER, 1799

One specimen (leg. ?) in the collection JACOBS: Brasschaat (FS08), 10.VII.1857.

Already mentioned by DERENNE (1957) from Virton, this record being classified as doubtful. This species, formerly interpreted as a subspecies of *Carabus variolosus* FABRICIUS, 1787, shows a restricted distribution pattern in central Europe. FREUDE *et al.* (1976) state that the area of this species has been reduced even further during this century, e.g. from northern and central Germany (and apparently sporadically also our country) down to the surroundings of the lower alpine region only.

(B6) *Drypta dentata* (ROSSI, 1790)

One specimen (leg. ?) in the general reference collection of the Royal Belgian entomological Society: Geraadsbergen (ES62), 1868.

DERENNE (1957) mentioned the species from our country without data and therefore he did not include it in the Belgian fauna. Again, most probably we are dealing with a vagrant specimen from this hygrophilous species occurring in central and southern Europe, the British Isles and northern Africa (JEANNEL, 1942).

(B7) *Harpalus hirtipes* (PANZER, 1797)

One specimen (leg. ?) in the collection JACOBS: Soignies (ES70), 30.V.1872.

Until now, the species had only been mentioned by MATHIEU (1857) as known from the province of Hainaut, without reference material ever having been traced. The more 'recent' specimen from the collection JACOBS seems to confirm MATHIEU's statement, but additional data are necessary to show that it once occurred there in reproducing populations. At present we interpret this data as most probably concerning a vagrant specimen. FREUDE *et al.* (1976) consider this xerophilous species to have a very local occurrence in central Europe (from France to Siberia) and report its preference for sandy soil.

(B8) *Harpalus sulphuripes* GERMAR, 1824

One specimen (leg. DHAENS) in the collection GUILLEAUME: Spa (GR09), 15.V.1934.

Harpalus sulphuripes was already mentioned by FAGEL (1935), who probably referred to this specimen, which we had not been able to trace until now. Other observations from La Roche (DE RUETTE, 1945) and Torgny (DERENNE, 1951) so far cannot be checked through lack of reference material, but, somewhat surprisingly, are not mentioned by DERENNE (1957). From La Roche we could find material from the same date of

capture but belonging to *Harpalus honestus* (DUFTSCHMID, 1812), a closely related species, hard to distinguish from *Harpalus sulphuripes*. FREUDE *et al.* (1976) describe the occurrence in western and southern Europe, to the north up to central France, with very old data only for Alsace and Germany. In central Europe nowadays the species most probably only persists in Austria and the Czech and Slovak Republics.

(B9) *Licinus cassideus* (FABRICIUS, 1792)

One specimen (leg. ?) in the collection JACOBS: Florenville (FR60), 12.IX.1859.

Licinus cassideus is classified as a xerophilous species by FREUDE *et al.* (1976), reported to occur in central and southeastern Europe, France, as well as the Caucasus and Siberia. According to these authors this species is represented mostly by old records. MATHIEU (1857) refers to 'a rare species, found under stones on dry sites in the Belgian Ardennes'. Apparently the species seems extinct in our country since the end of the former century, supposing that it has had a reproducing population at all. The above-mentioned single reference specimen moreover was caught close to the border region with France, strengthening the interpretation of accidental immigration.

(B10) *Metabletus obscuroguttatus* DUFTSCHMID, 1812

One specimen (leg. G. FAGEL, cfr. FAGEL & GUILLEAUME, 1935) in the collection GUILLEAUME: HOUX (FR37), 7.VII.1935.

This species was already mentioned by MATHIEU (1857) for 'Flanders', but no reference specimens have ever been recovered. Reference to the above-mentioned specimen was made by DERENNE (1957). FREUDE *et al.* (1976) describe the occurrence of *Metabletus obscuroguttatus* in western and southern Europe, especially in wet grassland, but also in dry woodland. The single specimen from HOUX was beaten from shrubs near the remnants of a castle (FAGEL & GUILLEAUME, 1935) and probably concerned a vagrant individual. According to LINDROTH (1974) this is a full-winged species living between moss in rather moist habitats on heavy soil. The two remaining species of the genus, both common in our region, *Metabletus foveatus* and *Metabletus truncatellus*, on the contrary are known as wing dimorphic carabids with a very low fraction of macropterous individuals (DESENDER, 1986).

(B11) *Pterostichus metallicus* (FABRICIUS, 1792)

One specimen (leg. ?) in the collection JACOBS: Daverdisse (FR43), 30.IX.1850.

MATHIEU (1857) mentioned the species from the surroundings of Verviers (no traceable reference specimen of this observation). DERENNE (1957)

consequently did not include this species in the Belgian fauna. Apparently this is a more or less montane and subalpine woodland inhabiting species from central Europe, especially more common to the east (as far as the Balkans) (FREUDE *et al.*, 1976), and absent from the British Isles (ZAHRADNÍK, 1991). In the absence of additional data or individuals, the above-mentioned observation could have concerned a vagrant specimen.

Discussion

Although these data mainly concern old to very old observations they enable us to add 15 more species to the checklist of ground and tiger beetles of Belgium (DESENDER, 1985; most recent update in DESENDER, 1995), which increases the total to 401 species. Several of these additional species however have not been captured during recent decades, or not even during this century and therefore probably have to be considered as extinct, assuming they have once been able to establish but a single reproducing population. A number of species can also be interpreted as vagrants or accidental immigrants into our country. Besides species documented to expand or diminish their geographical area due to climatic changes, such vagrants equally indicate dynamic biogeography (*sensu* HENGEVELD, 1990).

Acknowledgments

The enthusiastic local group of naturalists, involved in the study and management of 'Bos t'Ename', has stimulated, through their coordinator Mr. G. TACK, our currently ongoing entomological study in this woodland area. We cordially thank the members for their appreciated help in the intensive pitfall trap sampling. Although we will have to await more results from this study to draw well founded conclusions, the start of it anyway seems promising and we already acknowledge the support and enthusiasm of these helping hands. The study of several parts of the woodland would not have been possible without the permission of their private owners, Mr. D. and P. GEVAERT.

This study is performed at the University of Ghent in cooperation with C. VANDEN BUSSCHE, J.-P. MAELFAIT and D. DE BAKKER.

We are further indebted to G. COULON for giving us access to the collection GUILLEAUME, the collection JACOBS and the general collection of the Royal Belgian entomological Society.

Prof. Dr. E. KUYCKEN and Dr. J.-P. MAELFAIT are acknowledged for their involvement in the attribution of the study assignment and their interest and cooperation in the scientific realisation of the documented Red list of ground and tiger beetles in Flanders (External Assignment of the Institute for Nature Conservation, financed by the Ministry of the Flemish Community).

Dr. P. GROOTAERT and Dr. A. HUYSSSEUNE took the time to critically read and comment on an earlier draft of the manuscript, for which they are gratefully acknowledged.

References

- BOEKEN, M., 1987. - *De loopkevers (Cicindelidae en Carabidae) van Nederland*. Jeugdbondsuitgeverij, 155 pp.
- BONADONA, P., 1971. - Catalogue des Coléoptères Carabiques de France. *Suppl. Nouv. Revue Ent.* 1: 177 pp.
- DERENNE, E., 1951. - Coléoptères et Hyménoptères intéressants pour la faune Belge. *Bull. Anns Soc. ent. Belg.*, 87: 94-95.
- DERENNE, E., 1957. - *Catalogue des Coléoptères de Belgique. Fasc. II. 1. Caraboidea Carabidae*. Société royale d'Entomologie de Belgique, Bruxelles, 116 pp.
- DERENNE, E. & FAGEL, G. 1936. - Additions au Catalogue des Coléoptères de Belgique. *Bull. Anns Soc. ent. Belg.*, 76: 65-66.
- DE RUETTE, R., 1945. - Additions au Catalogue des Coléoptères de Belgique. *Bull. Anns Soc. ent. Belg.*, 81: 163-168.
- DESENDER, K., 1985. - Naamlijst van de loopkevers en zandloopkevers van België (Coleoptera, Carabidae). *Studiedocumenten Kon. Belg. Inst. Natuurwet.* 19: 36 pp.
- DESENDER, K., 1986. - Distribution and ecology of Carabid beetles in Belgium (Coleoptera, Carabidae). Part 4. Species 218-379 (Amarini, Zabrinini, Harpalini, Licinini, Chlaeniini, Oodini, Panagaeini, Odacanthini, Masoreini, Lebiini, Brachinini). *Studiedocumenten Kon. Belg. Inst. Natuurwet.* 34: 48 pp.
- DESENDER, K., 1987. - Ground beetles (Col., Carabidae) new or confirmed for the Belgian fauna. *Bull. Anns Soc. r. belge Ent.* 123: 334-336.
- DESENDER, K., 1989. - Dispersievermogen en Ecologie van Loopkevers (Coleoptera, Carabidae) in België: een evolutionaire benadering. *Studiedocumenten Kon. Belg. Inst. Natuurwet.* 54: 135 pp.
- DESENDER, K., 1990. - Preliminary note on *Asaphidion curtum* (Heyden, 1870) and *A. stierlini* (Heyden, 1880): two Carabid beetles new for the Belgian fauna (Coleoptera: Carabidae). *Bull. Anns Soc. r. belge Ent.* 126: 179-180.
- DESENDER, K., 1992. - *Amara majuscula*, a carabid beetle new for the Belgian fauna: overlooked or only a temporary visitor? *Bull. Anns Soc. r. belge Ent.* 128: 298-301.
- DESENDER, K., 1995. - Coleoptera, Carabidae. In: COULON, G. (ed.), *Enumeratio Coleopterorum Belgicae 1*, Publ. Soc. r. belge Ent.: 13-28.
- DESENDER, K. & MAELFAIT, J.-P., in press. - Ground beetles, spiders and other terrestrial arthropods of riparian habitats along the tidal river Scheldt and Durme: gradient analysis of a neglected fauna. *Belg. J. Zool.*
- DESENDER, K., MAES, D., MAELFAIT, J.-P. & VAN KERCKVOORDE, M., in press. - *Een gedokumenteerde Rode lijst van de zandloop- en loopkevers van Vlaanderen (Coleoptera: Cicindelidae, Carabidae)*. Instituut voor Natuurbehoud van de Vlaamse Gemeenschap, 197 pp.
- FAGEL, G., 1935. - Additions au Catalogue des Coléoptères de Belgique. *Bull. Anns Soc. ent. Belg.*, 75: 75-76.

- FAGEL, G., 1937. - Additions au Catalogue des Coléoptères de Belgique. *Bull. Anns Soc. ent. Belg.*, 77: 302-304.
- FAGEL, G. & GUILLEAUME, F., 1935. - Additions au Catalogue des Coléoptères de Belgique. *Bull. Anns Soc. ent. Belg.*, 75: 331-334.
- FREUDE, H., HARDE, K.W. & LOHSE, G. A., 1976. - *Die Käfer Mitteleuropas. Band 2. Adephaga 1*. Goecke & Evers Verlag, Krefeld, 302 pp.
- HENGEVELD, R., 1990. - *Dynamic biogeography*. Cambridge Studies in Ecology (eds. BARNES, R.S.K., BIRKS, H.J.B., CONNOR, E.F., PAINE, R.T.). Cambridge University Press, Cambridge, 249 pp.
- JEANNEL, R., 1942. - Coléoptères carabiques. Deuxième partie. *Faune Fr.*, 40: 573-1173.
- LINDROTH, C.H., 1974. - Coleoptera, Carabidae. *Handbk Ident. Br. Insects IV*, Part 2: 148 pp.
- LOHSE, G.A. & LUCHT, W.H., 1989. - *Die Käfer Mitteleuropas. Band 12. 1. Supplementband mit Katalogteil*. Goecke & Evers Verlag, Krefeld, 346 pp.
- MATHIEU, C., 1857. - Coléoptères. *Anns Soc. ent. belge*, 1: 116-173.
- NETOLITZKY, F. & MEYER, P., 1937. - Die Verbreitung des *Bembidion Illigeri* Net. (*quadriguttatum* Ill.) und des *B. Genei* Küst. *Ent. Bl.*, 33 (Beilage): 1 map, 2 unnumbered pp.
- TRAUTNER, J. & GEIGENMÜLLER, K., 1987. - *Tiger beetles, ground beetles. Illustrated key to the Cicindelidae and Carabidae of Europe*. Verlag Josef Margraf, Aichtal, 488 pp.
- ZAHRADNIK, J., 1991. - *Insectes*. Aventinum, Prague, 312 pp.