

ヒメミミズ科の1999年以降の種の追録

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ヒメミミズ科の1999年以降の種の追録

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Mana NOZAKI* and Yoshio NAKAMURA* : Additional list of Enchytraeidae species
(Annelida : Oligochaeta) since 1999

Abstract

Enchytraeid worms (microdrilids) are designated as potworms which belong to the group of the soil pedosphere together with earthworms (megadrilids). Recently, their contribution to three functions (decomposition, production and self-purification) of the soil pedosphere is clarified. Since the checklist of Enchytraeidae of the world was published in 2000, many species were described throughout the world. We listed them in this report.

キーワード：ヒメミミズ科，種，記載

1 はじめに

ヒメミミズ科は環形動物門貧毛類に属し，“エンキ”と称される。貧毛類（ミミズ類）はこのヒメミミズ科などの小型ミミズ群と、ツリミミズ科やフトミミズ科などの大型ミミズ群に分けられる。

Darwin (1904) がミミズに関する書籍を刊行以来、大型ミミズ群に関する情報が多く出され、土壤圏の有する3機能（分解，調整，生産）における重要な役割が指摘されている（Edwards and Lofty, 1972；中村, 1998）。それに比べてヒメミミズ科に関する情報（分類・生態とも）は少なく、とくに日本の情報は少ない。

ヒメミミズ科の生息場は氷河・タイガから熱帯雨林、湿地・海浜・海中（海綿寄生）と多岐にわたり（Nielsen and Christensen, 1959；O'Connor, 1967），陸生種と水（淡水・海水）生種がある。このうち陸生種は体長1-20ミリほどで細長く、乳白から淡黄色である。センチウと混同されたり、腐敗した作物や樹木の根から見つかることから農業上害動物とされる（Kurir, 1964；Hewit, 1908）。しかし、ヒメミミズ科に関する情報がしだいに集積するとともに、土壤圏の機能への寄与が明らかにされ、その内容は大型ミミズ群と同じあるいは固有のことがらもある（Dash, 1983；中村, 1993a）。モダ腐植の生成には欠かせない生物で（中村, 1980；Toutain, 1987；Yli-Olli and Huhta,

2000），極地（Swift *et al.*, 1998），凍土や標高3000m以上（Block and Christensen, 1985）の土壤生成にも重要な役割を果たす。環境指標生物、とくに重金属や薬剤の急性・慢性判定生物（Didden and Römbke, 2001）として、さらに碎片分離種（例：*Enchytraeus japonensis* NAKAMURA, 1990）は再生（茗原, 1999），発光種（例：*Fridericia heliota* ZALESSKAJA, 1990）は系統発生（Rota *et al.*, 2003）の実験動物に供される。

畑地生態系では土壤構造の形成や物質循環に寄与する（Kasprzack, 1982）。今後の大きな課題は、土壤動物とともに土壤圏のエダホン（Edaphon : Francé, 1920；土壤生物）を構成する土壤微生物、とくに作物病原性微生物との関連を明らかにすることにある（中村, 1993a；Nakamura, 2000）。大型ミミズ群が生息・活動し難い農法においては、大型ミミズ群に替わる土壤環境形成動物（Lavelle *et al.*, 1998）としての可能性は高い（中村, 1991；Topoliantz *et al.*, 2000）。例えば大型ミミズ群に致命的打撃を与える耕起が不可欠な農法、あるいは大型ミミズ群を捕食するモグラの根食害や土壤攪乱などの被害を避けるために、大型ミミズ群を増殖させない農法においてとくに有効と想定される（Nakamura *et al.*, 2003）。水田生態系にも水生類とともに多数生息し（中村, 1993b；横田, 2002），とくに水生類が生息・活動し難い落水から次の植え付け期間では、水生類に替わる土壤環境形成動物としての可能性は高い（中村, 1988）。

生ゴミなどの有機物の堆肥化においても、大型ミミズ群の堆肥ミミズ（シマミミズ：*Eisenia fetida*）とともに重要な役割を果たし（中村, 1998），また小魚（ト

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ゲウオ, ヒメハヤ) の生き餌とされる (Wu *et al.*, 2003).

わが国におけるヒメミミズ科の分類の情報は少なく, 著者らの知る限りでは, 記録は15種にすぎない(中村, 2000). 2000年にそれまでヒメミミズ科として世界から記載された32属594種が収録された(中村, 2000). 本報告ではその後に記載された種を収録した.

2 目録 (1999年以降に種として記載された; なお一部に前報収録後の同〈1998〉年に記載された種を含む)

前報(中村, 2000)に準じて次の順序で記載した:

○属名, 命名者, 記載年 属和名(命名者, 記載年)
〈属内の群分けのための基準〉

種名, 命名者, 記載年

種名, 命名者, 記載年, 誌名, 巻, 頁, 図番号
なお和名は日本産に与えられている.

○*Achaeta* VEJDOVSKY, 1877

ケナシヒメミミズ属(中村, 1999)
〈付属小球(follicle)無し〉

Achaeta gigantea DÓZSA-FARKAS, 2000

Achaeta gigantea DÓZSA-FARKAS, 2000, Opusc. Zool. Budapest, 32, p. 82, figs. 1-2.

Achaeta macrocyta CHRISTENSEN et DÓZSA-FARKAS, 1999

Achaeta macrocyta CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 28, fig. 20.

○*Bryodrilus* UDE, 1892

タケヒメミミズ属(中村, 1999)

Bryodrilus longifistulatus XIE, LIANG et WANG, 2000

Bryodrilus longifistulatus XIE, LIANG et WANG, 2000c, Species Diversity, 5, p. 96, fig. 2.

Bryodrilus macrotheca XIE, LIANG et WANG, 2000

Bryodrilus macrotheca XIE, LIANG et WANG, 2000c, Species Diversity, 5, p. 98, fig. 3.

Bryodrilus tunicatus DÓZSA-FARKAS et CHRISTENSEN, 2002

Bryodrilus tunicatus DÓZSA-FARKAS et CHRISTENSEN, 2002, Natura Jutlandica (Occasional papers), 2, p.69, fig. 1.

○*Cognettia* NIELSEN et CHRISTENSEN, 1959

アミメヒメミミズ属(中村, 1999)

Cognettia bisetosa CHRISTENSEN et DÓZSA-FARKAS, 1999

Cognettia bisetosa CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 14, fig. 8, table II.

Cognettia hayachinensis NAKAMURA, 2001

Cognettia hayachinensis NAKAMURA, 2001, Edaphologia, 68, p. 15, fig. 1a-d.

Cognettia piperi CHRISTENSEN et DÓZSA-FARKAS, 1999

Cognettia piperi CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 16, fig. 10, table II.

Cognettia quadrosetosa CHRISTENSEN et DÓZSA-FARKAS, 1999

Cognettia quadrosetosa CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 15, fig. 9, table II.

○*Enchytraeus* HENLE, 1837

ヒメミミズ属(中村, 1987)
〈貯精囊(spermathecae)無し〉

Enchytraeus athecathus WANG, XIE et LIANG, 1999

Enchytraeus athecathus WANG, XIE et LIANG, 1999, Hydrobiologia, 406, p. 62, fig. 5B-D, table 2.

〈貯精囊(spermathecae)有り〉

Enchytraeus chaoyangensis XIE, LIANG et WANG, 2000

Enchytraeus chaoyangensis XIE, LIANG et WANG, 2000d, Acta Hydrobiol., 42, p. 69, fig. 1.

Enchytraeus luxuriosus SCHMELZ et COLLADO, 1999

Enchytraeus luxuriosus SCHMELZ et COLLADO, 1999, Carolina, 57, p. 93, figs. 1-2.

Enchytraeus syracussus (DASH et MITCHELL, 1981)

所属変更

Fridericia syracussa DASH et MITCHELL, 1981, Rev. Ecol. Sol., 18, p. 259, figs. 1-4.

Enchytraeus syracussus: SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 394, fig. 73S, T.

○*Fridericia* MICHAELSEN, 1889

ハタケヒメミミズ属(中村, 1987)
〈貯精囊(spermatheca)膨大部(ampula)無し〉

Fridericia armenica : SCHMELZ, 2003

Fridericia armenica SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 104, figs. 13E-H, 14A-E.

Fridericia benti SCHMELZ, 2002

Fridericia benti SCHMELZ, 2002, Natura Jutlandica (Occasional papers), 2, p. 78, fig. 2a.

Fridericia composti SCHMELZ, 2003

Fridericia composti SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 158, fig. 21B-D.

Fridericia cusanica SCHMELZ, 2003

Fridericia cusanica SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 170, figs. 2A, 28J-M.

***Fridericia lorentensis* SCHMELZ, 2003**

Fridericia lorentensis SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 225, fig. 43A-C.

***Fridericia parathalassia* SCHMELZ, 2002**

Fridericia parathalassia SCHMELZ, 2002, Natura Jutlandica (Occasional papers), 2, p. 79, fig. 2g-i.

***Fridericia paraunistetosa* XIE, LIANG et WANG, 2000**

Fridericia paraunistetosa XIE, LIANG et WANG, 2000b, Species Diversity, 5, p. 55, fig. 2.

***Fridericia unisetosa* XIE, LIANG et WANG, 2000**

Fridericia unisetosa XIE, LIANG et WANG, 2000b, Species Diversity, 5, p. 54, fig. 1.

〈貯精囊 (spermatheca) 膨大部 (ampula) 2 個有り〉

***Fridericia argillae* SCHMELZ, 2003**

Fridericia argillae SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 102, figs. 12A-D, 13A-D.

***Fridericia auritoides* SCHMELZ, 2003**

Fridericia auritoides SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 109, figs. 1A, 16A-G.

***Fridericia chongqingensis* XIE, LIANG et WANG, 1999**

Fridericia chongqingensis XIE, LIANG et WANG, 1999, Acta Hydrobiol. Sinica, 23 (suppl.), p.158, fig. 1A-E, table 1.

***Fridericia christiani* BAUER, 1998**

Fridericia christiani BAUER, 1998, Linzer Biol. Beitr., 30, p. 5, figs. 1-2.

Fridericia christiani : 中村, 2000, 東北農試研究資料, 24, p. 52. 〈未検討種 not seen〉

***Fridericia dozsae* SCHMELZ, 2003**

Fridericia dozsae SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 183, figs. 6B, 32J-M.

***Fridericia granosa* SCHMELZ, 2003**

Fridericia granosa SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 202, fig. 37A-F.

***Fridericia healyae* SCHMELZ, 2003**

Fridericia healyae SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 205, figs. 38A-G.

***Fridericia heliota* ZALESSKAJA, 1990**

Fridericia heliota ZALESSKAJA, 1990, in Zalesskaja, Petushkov & Rodionova, 1990, Dokl. Akad. Nauk SSSR (Biol.), 310, p. 496, fig. 1.

Fridericia heliota : ROTA, ZALESSKAJA, RODIONOVA & PETUSHKOV, 2003, J. Zool. Lond., 260, p. 292, figs. 1-3.

***Fridericia humicola* BRETCHER, 1900**

Fridericia humicola BRETCHER, 1900, Rev. Suisse Zool., 8, p. 30.

Fridericia humicola : 中村, 2000, 東北農試研究資料, 24, p. 52. 〈未確定種 species dubiae〉

Fridericia humicola : SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 214, figs. 1A, 39A-C.

***Fridericia lenta* SCHMELZ, 2003**

Fridericia lenta SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 221, figs. 1B, 41A-J, 42A-H.

***Fridericia multisegmentata* WANG, XIE et LIANG, 1999**

Fridericia multisegmentata WANG, XIE et LIANG, 1999, Hydrobiologia, 406, p. 62, fig. 4B-D, table 1.

***Fridericia nanningensis* XIE, LIANG et WANG, 2001**

Fridericia nanningensis XIE, LIANG et WANG, 2001, Proceedings Biol. Soc. Washington, 114, p. 276, fig. 4 A-E, table 1.

***Fridericia sardorum* COGNETTI, 1901**

Fridericia sardorum COGNETTI, 1901, Boll. Mus. Zool. Anat. Torino, 16 (404), p. 7, figs. 5-6.

Fridericia sardorum : 中村, 2000, 東北農試研究資料, 24, p. 52. 〈未確定種 species dubiae〉

Fridericia sardorum : SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 313, fig. 60I-L.

***Fridericia sohlenii* ROTA, HEALY et ERSÉUS, 1998**

Fridericia sohlenii ROTA, HEALY et ERSÉUS, 1998, Zool. Anz., 237, p. 161, fig. 2A-D.

***Fridericia viridula* ISSEL, 1905**

Fridericia viridula ISSEL, 1905, Ann. Mus. Stor. Nat. Genova, (3), 2, p. 34, figs. 9-11.

Fridericia viridula : 中村, 2000, 東北農試研究資料, 24, p. 52. 〈未確定種 species dubiae〉

Fridericia viridula : SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 344, fig. 67A-I.

〈貯精囊 (spermatheca) 膨大部 (ampula) 3 個あるいはそれ以上有り〉

***Fridericia glandifera* FRIEND, 1911**

Fridericia glandifera FRIEND, 1911, Nott. Trans. Nat. Soc., 59, p. 40.

Fridericia glandifera : 中村, 2000, 東北農試研究資料, 24, p. 52. 〈未確定種 species dubiae〉

Fridericia glandifera : SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 196, figs. 34F-K, 35A-E.

〈貯精囊 (spermatheca) 膨大部 (ampula) 片側膨らみ〉

***Fridericia dissimilis* DUMNICKA, 1998**

Fridericia dissimilis DUMNICKA, 1998, Annls Limnol., 34, p. 155, figs. 1-2, table 1.

Fridericia dissimilis : 中村, 2000, 東北農試研究資料,

24, p. 52. <未検討種 not seen>

***Fridericia monopera* COGNETTI, 1903**

Fridericia monopera COGNETTI, 1903, Boll. Mus. Zool. Anat. Torino, 18 (454), p. 2.

Fridericia monopera : 中村, 2000, 東北農試研究資料, 24, p. 52. <未確定種 species dubiae>

Fridericia monopera : SCHMELZ, 2003, Abh. Naturw. Ver. Hamburg, 38, p. 248, table 4.

○***Grania* SOUTHERN, 1913**

***Grania aquitana* ROTA et ERSÉUS, 2003**

Grania aquitana ROTA et ERSÉUS, 2003, Sarsia, 88, p. 226, fig. 7, table 1.

***Grania canaria* ROTA et ERSÉUS, 2003**

Grania canaria ROTA et ERSÉUS, 2003, Sarsia, 88, p. 213, fig. 1, table 1.

***Grania dolichura* ROTA et ERSÉUS, 2000**

Grania dolichura ROTA et ERSÉUS, 2000, N. Z. J. Zool., 27, p. 249, fig. 3.

***Grania fortunata* ROTA et ERSÉUS, 2003**

Grania fortunata ROTA et ERSÉUS, 2003, Sarsia, 88, p. 215, fig. 2, table 1.

***Grania mauretania* ROTA et ERSÉUS, 2003**

Grania mauretania ROTA et ERSÉUS, 2003, Sarsia, 88, p. 224, fig. 6, table 1.

***Grania papillinasus* ROTA et ERSÉUS, 2003**

Grania papillinasus ROTA et ERSÉUS, 2003, Sarsia, 88, p. 239, fig. 13.

***Grania tasmaniae* ROTA et ERSÉUS, 2000**

Grania tasmaniae ROTA et ERSÉUS, 2000, N. Z. J. Zool., 27, p. 247, fig. 2.

***Grania torosa* ROTA et ERSÉUS, 2003**

Grania torosa ROTA et ERSÉUS, 2003, Sarsia, 88, p. 237, fig. 12.

***Grania vikinga* ROTA et ERSÉUS, 2003**

Grania vikinga ROTA et ERSÉUS, 2003, Sarsia, 88, p. 222, fig. 5.

○***Hemienchytraeus* CERNOSVITOV, 1934**

ハンヒメミミズ属 (中村, 1999)

***Hemienchytraeus brachytecus* XIE, WANG et LIANG, 1999.**

Hemienchytraeus brachytecus XIE, WANG et LIANG, 1999, Acta Hydrobiol. Sinica, 23, p. 355, fig. 2A-J, table 2.

***Hemienchytraeus planisetosus* XIE, WANG et LIANG, 1999.**

Hemienchytraeus planisetosus XIE, WANG et LIANG, 1999, Acta Hydrobiol. Sinica, 23, p. 353, fig. 1A-I, table 1.

○***Henlea* MICHAELSEN, 1889b**

コブヒメミミズ属 (新川, 1987)

<腸付属物 (intestinal diverticula) 無し>

***Henlea adiverticulata* CHRISTENSEN et DÓZSA-FARKAS, 1999**

Henlea adiverticulata CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 18, fig. 11, table III.

<腸付属物 (intestinal diverticula) は大きくかたまり状>

***Henlea conchifera* CHRISTENSEN et DÓZSA-FARKAS, 1999**

Henlea conchifera CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 19, fig. 12, table III.

○***Marionina* MICHAELSEN, 1889b**

ミズヒメミミズ属 (中村, 1999)

<剛毛 (setae) は直線状 (straight) で, 貯精囊 (spermathecae) は腸 (intestine) と連結しない (free)>

***Marionina righiana* XIE et ROTA, 2001**

Marionina righiana XIE et ROTA, 2001, J. Natural Hist., 35, p. 1425, fig. 4A-D.

<剛毛 (setae) は直線状 (straight) で, 貯精囊 (spermathecae) は腸 (intestine) と連結 (connect)>

***Marionina nordica* CHRISTENSEN et DÓZSA-FARKAS, 1999**

Marionina nordica CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 29, fig. 21A-F, table VI.

***Marionina sacculata* XIE et ROTA, 2001**

Marionina sacculata XIE et ROTA, 2001, J. Natural Hist., 35, p. 1421, fig. 2A-E.

***Marionina seminuda* XIE et ROTA, 2001**

Marionina seminuda XIE et ROTA, 2001, J. Natural Hist., 35, p. 1423, fig. 3A-F.

***Marionina sexdiverticulata* DÓZSA-FARKAS, 2002**

Marionina sexdiverticulata DÓZSA-FARKAS, 2002a, The fauna of the Fertő-Hanság National Park., Hungarian Natural History Museum, Budapest, p. 159, figs. 2-4.

***Marionina sinica* XIE et ROTA, 2001**

Marionina sinica XIE et ROTA, 2001, J. Natural Hist., 35, p. 1419, fig. 1A-C.

***Marionina spongicola* ROTA et MANCONI, 2004**

Marionina spongicola ROTA et MANCONI, 2004, Internat. Rev. Hydrobiol., 89, p. 59, fig. 1.

○*Mesenchytraeus* EISEN, 1877 (1979)

ナカヒメミミズ属 (中村, 1999)

〈貯精囊 (spermathecae) の付属腺 (diverticula) が無く, 腸 (intestine) と連結しない (free)〉

Mesenchytraeus rhithralis HEALY et FEND, 2002

Mesenchytraeus rhithralis HEALY et FEND, 2002, J. Natural Hist., 36, p. 17, fig. 1.

Mesenchytraeus sveni CHRISTENSEN et DÓZSA-FARKAS, 1999

Mesenchytraeus sveni CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 8, fig. 4, table I.

〈貯精囊 (spermathecae) の付属腺 (diverticula) が1個有り, 腸 (intestine) と連結 (connect)〉

Mesenchytraeus kuril HEALY et TIMM, 2000

Mesenchytraeus kuril HEALY et TIMM, 2000, Species Diversity, 5, p. 178, fig. 1.

Mesenchytraeus torbeni CHRISTENSEN et DÓZSA-FARKAS, 1999

Mesenchytraeus torbeni CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 7, fig. 3, table I.

〈貯精囊 (spermathecae) の付属腺 (diverticula) が2個有り, 腸 (intestine) と連結しない (free)〉

Mesenchytraeus antaeus ROTA et BRINKHURST, 2000

Mesenchytraeus antaeus ROTA et BRINKHURST, 2000, J. Zool. Lond., 252, p. 29, figs. 1-9.

Mesenchytraeus melanocephalus CHRISTENSEN et DÓZSA-FARKAS, 1999

Mesenchytraeus melanocephalus CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 6, fig. 2, table I.

○*Oconnorella* ROTA, 2000*Oconnorella changbaishanensis* (XIE, LIANG et WANG, 2000)

Marionina changbaishanensis XIE, LIANG et WANG, 2000a, Acta Zootaxonomica Sinica, 25, p. 143, figs. 1-7.

Oconnorella changbaishanensis: DÓZSA-FARKAS, 2002b, Natura Jutlandica (Occasional papers), 2, p. 88, table 1.

Oconnorella macrobulbi (CHRISTENSEN et DÓZSA-FARKAS, 1999)

Marionina macrobulbi CHRISTENSEN et DÓZSA-FARKAS, 1999, Biol. Skrift., 52, p. 30, fig. 22, table VI.

Oconnorella macrobulbi: DÓZSA-FARKAS, 2002b, Natura Jutlandica (Occasional papers), 2, p. 88, table 1.

参考文献

- Bauer, R. (1998) *Fridericia christiani* sp. n. - a new enchytraeid species from a pasture in Salzburg (Austria). Linzer Biol. Beitr., **30**: 5-9.
- Block, W. & B. Christensen (1985) Terrestrial enchytraeids from South Georgia and the Maritime Antarctic. British Antarctic Survey Bulletin, **69**: 65-70.
- Bretscher, K. (1900) Mitteilungen über die Oligochaetenfauna der Schweiz. Rev. Suisse Zool., **8**: 1-44.
- Christensen, B. & K. Dózsa-Farkas (1999) The enchytraeid fauna of the Palearctic tundra (Oligochaeta, Enchytraeidae). Biol. Skrift., **52**: 1-37.
- Cognetti, L. (1901) Gli Oligocheti della Sardegna. Boll. Mus. Zool. Anat. Torino, **16** (404): 1-12.
- Cognetti, L. (1903) Enchitreidi del Cadore. Boll. Mus. Zool. Anat. Torino, **18** (454): 1-4.
- Darwin, Ch. (1904) The formation of vegetable mould through the action of worms with observations on their habits. John Murray, London, 298pp.
- Dash, M. C. (1983) Biology of Enchytraeidae. Intern. Book Distributors, Dheradun (India), 171pp.
- Dash, M. C. & M. J. Mitchell, 1981. *Fridericia syracussa* (Oligochaeta: Enchytraeidae): a new species found in sewage sludge. Rev. Ecol. Biol. Sol., **18**: 259-261.
- Didden, W. A. M. & J. Römbke (2001) Enchytraeids as indicator organisms for chemical stress in terrestrial ecosystems. Ecotoxi. Environ. Safety, **50**: 25-43.
- Dózsa-Farkas, K. (2000) *Achaeta gigantea* sp. n., a large-sized species of Enchytraeidae (Oligochaeta) from South Africa. Opusc. Zool. Budapest, **32**: 81-85.
- Dózsa-Farkas, K. (2002a) The enchytraeid fauna (Annelida, Oligochaeta: Enchytraeidae) of the Fertő-Hanság national park. The fauna of the Fertő-Hanság National Park, Hungarian Natural History Museum, Budapest, pp. 151-163.
- Dózsa-Farkas, K. (2002b) Notes on the genus *Oconnorella* Rota, 1995. Natura Jutlandica (Occasional papers), **2**: 86-90.
- Dózsa-Farkas, K. & B. Christensen (2002) A new enchytraeid species *Bryodrillus tunicatus* (Enchytraeidae, Oligochaeta) from Alaska. With preliminary notes on the enchytraeid fauna of the Alaskan tundra and taiga. Natura Jutlandica (Occasional papers), **2**: 68-74.
- Dumnicka, E. (1998) A new species of *Fridericia* (Oligochaeta: Enchytraeidae) found in a spring in the Sudety mountains (Poland). Annls Limnol., **34**: 155-158.
- Edwards, C. A. and J. R. Lofty (1972) Biology of earthworms. Chapman & Hall, London, 283pp.
- Francé, R. H. (1921) Das Edaphon, Untersuchungen zur Oekologie der bodenbewohnenden Mikroorganismen, Arbeiten aus dem Biolog. Institut München, no. 2, 99pp.
- Friend, H. (1911) Annelid hunting in Notts. Nott. Trans. Nat. Soc., **59**: 30-44.
- Healy, B. & S. Fend (2002) The occurrence of *Mesenchytraeus* (Enchytraeidae: Oligochaeta) in riffle habitats of north-west American rivers, with description of a new species. J. Natural Hist., **36**: 15-23.
- Healy, B. & T. Timm (2000) *Mesenchytraeus kuril*, a new species of Enchytraeidae (Annelida: Oligochaeta) from Kamčatka, Russian far east. Species Diversity, **5**: 177-

- 182.
- Hewitt, C. G. (1908) On an enchytraeid worm injurious to the seedlings of the larch. *J. Econ. Biol.* **3**: 43–45.
- Issel, R. (1905) Materiali per una fauna dell'arcipelago Toscano Isola D'Elba. *Ann. Mus. Stor. Nat. Genova*, (3), **2**: 5–8.
- Kasprzack, K. (1982) Review of enchytraeids (Oligochaeta community structure and function in agricultural ecosystems.). *Pedobiologia*, **23**: 217–232.
- Kurir, A. (1964) *Fridericia galba* (Enchytraeidae) als Fichtenschadling in einem Fortstgarten. *Pedobiologia*, **4**: 269–280.
- Lavelle, P., D. Bignell, M. Lepage, V. Wolters, P. Roger, P. Ineson, O. W. Heal & S. Dhillon (1998) Soil function in a changing world: the role of invertebrate ecosystem engineers. *Eur. J. Soil Biol.*, **33**: 159–193.
- 茗原真路子 (1999) 再生研究の新しいモデル実験動物～ヤマトヒメミミズの生物学. 遺伝, **53** (11): 47–52.
- 中村好男 (1980) 土壌における生物の役割, とくにミミズと土について, ペドロジスト, **24**: 44–50.
- 中村好男 (1988) 水田. 農環研年報, **6**: 79–82.
- 中村好男 (1991) 土壌生態系活用型農業とそれを支える土壌動物. 東北農業研究 (別号), **4**: 43–59.
- 中村好男 (1993a) 土壌微生物にとっての土壌動物とは. 耕地のトビムシ, ササラダニ, ヒメミミズ活用による生物防除を例に. 土と微生物, **42**: 43–59.
- 中村好男 (1993b) 農業を支える土のいきもの～土壌動物. 学術会議公開シンポジウム要旨, **1–8**.
- 中村好男 (1998) ミミズと土と有機農業. 創森社. 123 頁.
- Nakamura, Y. (2000) Earthworms and potworms as keystone functional animals in pedospheres. *Farming Japan*, **34** (5): 10–15.
- 中村好男 (2000) ヒメミミズ類の種の目録. 東北農試研究資料, **24**: 29–104.
- Nakamura, Y. (2001) A new species of the genus *Cognettia* from Mt. Hayachine, northern Japan (Oligochaeta: Enchytraeidae) (Enchytraeids in Japan 6). *Edaphologia*, **68**: 15–16.
- Nakamura, Y. (2004) The relation of fragmentation frequency to fragment number in *Enchytraeus japonensis* NAKAMURA, 1993 (Oligochaeta, Enchytraeidae) cultured several years under laboratory conditions. *Mem. Fac. Agr. Ehime Univ.*, **49**: 19–26.
- Nakamura, Y., Shiraishi, H. & M. Nakai (2003) Earthworm and enchytraeid numbers in soybean-barley fields under till and no-till cropping systems in Japan during nine years. *Mem. Fac. Agr. Ehime Univ.*, **48**: 19–29.
- Nielsen, C. O. and B. Christensen (1959) The Enchytraeidae, critical revision and taxonomy of European species (Studies on Enchytraeidae VI). *Natura Jutlandica*, **8–9**: 1–160.
- O'Connor, F. B. (1967) The Enchytraeidae. In: *Soil Biology* (eds: Burges & Raws), 213–257.
- Rota, E. & R. Brinkhurst (2000) *Mesenchytraeus antaeus*, a new giant enchytraeid (Annelida, Clitellata) from the temperate rainforest of British Columbia, Canada, with a revised diagnosis of the genus *Mesenchytraeus*. *J. Zool. Lond.*, **252**: 27–40.
- Rota, E. & C. Erséus (2000) Two new and peculiar species of *Grania* (Annelida: Clitellata: Enchytraeidae) inhabiting Tasmanian estuaries. *N. Z. J. Zool.*, **27**: 245–254.
- Rota, E. & C. Erséus (2003) New records of *Grania* (Clitellata, Enchytraeidae) in the Northeast Atlantic (from Tromsø to the Canary Islands), with descriptions of seven new species. *Sarsia*, **88**: 210–243.
- Rota, E. & R. Manconi (2004) Taxonomy and ecology of sponge-associate *Marionina* spp. (Clitellata: Enchytraeidae) from the horomatangi geothermal system of Lake Taupo, New Zealand. *Internat. Rev. Hydrobiol.*, **89**: 58–67.
- Rota, E., Healy, B. & C. Erséus (1998) Biogeography and taxonomy of terrestrial Enchytraeidae (Oligochaeta) in northern Sweden, with comparative remarks on the genus *Henlea*. *Zool. Anz.*, **237**: 155–169.
- Rota, E., Zaleskaja, N. T., Rodionova, N. S. & V. N. Petushkov (2003) Redescription of *Fridericia heliota* (Annelida, Clitellata: Enchytraeidae), a luminous worm from the Siberian taiga, with a review of bioluminescence in the Oligochaeta. *J. Zool. Lond.*, **260**: 291–299.
- Schmelz, R. M. (2002) Records and taxonomy of *Fridericia* species (Enchytraeidae, Oligochaeta) found in the Mols area. *Natura Jutlandica* (Occasional papers), **2**: 75–85.
- Schmelz, R. M. (2003) Taxonomy of *Fridericia* (Oligochaeta, Enchytraeidae): Revision of species with morphological and biochemical methods. *Abh. Naturw. Ver. Hamburg*, **38**: 1–415.
- Schmelz, R. M. & R. Collado (1999) *Enchytraeus luxuriosus* sp. nov., a new terrestrial oligochaeta species (Enchytraeidae, Clitellata, Annelida). *Carolinaea*, **57**: 93–100.
- Swift, M. J., Andren, O., Brusaard, L., Briones, M., Couteaux, M. -M., Ekshmitt, K., Kjoller, A., Loiseau, P. & P. Smith (1998) Global change, soil biodiversity, and nitrogen cycling in terrestrial ecosystems: three case studies. *Global Change Biolo.*, **4**: 729–743.
- Topoliantz, S., Ponge, J-F & P. Viaux (2000) Earthworm and enchytraeid activity under different arable farming systems, as exemplified by biogenic structures. *Plant Soil*, **225**: 39–51.
- Toutain, F. (1987) Activite biologique des sols, modalites et lithodependance. *Biol. Fertil. Soils*, **3**: 31–38.
- Wang, H., Xie, Z. & Y. Liang (1999) Records of Enchytraeidae (Clitellate) from the People's Republic of China. *Hydrobiologia*, **406**: 57–66.
- Wu, L., Xie, S., Cui, Y. & R. J. Wootton (2003) Effect of cycles of feed deprivation on growth and food consumption of immature three-spined sticklebacks and European minnows. *J. Fish Biol.* **62**: 184–194.
- Xie, Z. & E. Rota (2001) Four new terrestrial species of *Marionina* (Clitellata, Enchytraeidae) from China and re-examination of *M. hoVbaueri* Möller. *J. Natural Hist.*, **35**: 1417–1431.
- Xie, Z., Liang, Y. & H. Wang (1999) Taxonomical studies on *Fridericia* (Enchytraeidae, Oligochaeta) along the Changjiang (Yangtze) basin. *Acta Hydrobiol. Sinica*, **23** (Suppl.): 158–163.
- Xie, Z., Liang, Y. & H. Wang (2000a) A new species of *Marionina* (Oligochaeta: Annelida: Enchytraeidae). *Acta Zootaxonomica Sinica*, **25**: 143–146.
- Xie, Z., Liang, Y. & H. Wang (2000b) Two new species of *Fridericia* (Enchytraeidae, Oligochaeta) from Changbaishan mountain, Jilin province, China. *Species Diversity*, **5**: 53–58.
- Xie, Z., Liang, Y. & H. Wang (2000c) A taxonomic study of

- Bryodrillus* (Enchytraeidae, Oligochaeta) from Changbaishan mountain, China. *Species Diversity*, **5**: 93–101.
- Xie, Z., Liang, Y. & H. Wang (2000d) *Enchytraeus chaoyangensis*, a new terrestrial culture species (Enchytraeidae, Oligochaeta) from northeastern China. *Acta Hydrobiol.*, **42**: 69–72.
- Xie, Z., Liang, Y. & H. Wang (2001) *Fridericia nanningensis*, a new terrestrial enchytraeid species (Oligochaeta) from southwestern China. *Proceedings Biol. Soc. Washington*, **114**: 275–279.
- Xie, Z., Wang, H. & Y. Liang (1999) Studies on the Enchytraeidae of China I. On new species and new records of the genus *Hemienchytraeus*. *Acta Hydrobiol. Sinica*, **23**: 352–358.
- Yli-Olli, A. & V. Huhta (2000) Responses of co-occurring populations of *Dendrobaena octaedra* (Lumbricidae) and *Cognettia sphagnetorum* (Enchytraeidae) to soil pH, moisture and resource addition. *Pedobiologia*, **44**: 86–95.
- 横田 啓 (2002) 水田における耕起方法の違いが小型ミミズ類の生息密度に及ぼす影響. *土肥誌*, **73**: 33–39.
- Zalesskaja, N. T., Petushkov, V. N. & N. S. Rodionova (1990) [Luminous soil-dwelling enchytraeids (Oligochaeta, Enchytraeidae)]. *Dokl. Akad. Nauk SSSR (Biol.)*, **310**: 496–498. (In Russian.)