

## Checklist of megadrile earthworms from Greenland and Iceland

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### Summary

Volcanic Iceland has approximately 18 lumbricid species, all introduced (e.g. Gates, 1972; Rundgren, 1999); and about 8 species are known from Greenland (and Disko Island) as summarized by Omodeo (1957), Stöp-Bowitz (1969) and Gates (1972). These species were listed from Greenland by Stöp-Bowitz (1969: 260): ?*Al. chlorotica*, *D. octaedra*, *D. norvegica*, and ?*L. rubellus*; but several other species were added by Gates (1972), viz. *D. rubidus*, *E. fetida*, and *L. terrestris*. These taxa are listed here in the most recently and accepted combinations, and all are in family Lumbricidae as revised by Blakemore (2004; 2005; 2006).

Greenland the world's largest island of 2,166,086 km<sup>2</sup> with about 80% of its area covered in ice. It is a self-governing Danish territory that withdrew from the EU membership in 1985. The area of Iceland is 103,000 km<sup>2</sup> with more than 75% barren land unable to support vegetation and about 10% glaciated. Like Greenland it has historical and cultural ties to Scandinavia and most earthworms were probably introduced ancillary to human settlement from around 1,100 year ago. Although some argue a "nunatak theory" of per-glacial survival on mountain peaks and ice-free refugia (e.g. Hansen *et al.* 2006) an alternative "tabula rasa hypothesis" of postglacial immigration (and human transportation) is gaining as endemism and disjunctions in the North Atlantic can be explained without invoking *in situ* glacial survival (e.g. Brockmann *et al.*, 2003).

### Systematics results

#### Species Checklist:

1. *Allolobophora chlorotica chlorotica* (Savigny, 1826) [syns. *virescens* Savigny, 1826; *anatomicus* Dugès, 1828; *riparius* Hoffmeister, 1843 (non Bretscher, 1901); *communis luteus* Hoffmeister, 1845; *viridis* Johnston, 1865; *riparius rufescens* Eisen, 1871 (non Johnston, 1827); *riparius pallescens* Eisen, 1871; *neglecta* Rosa, 1882; *cambrica* Friend, 1892 [= *cambrica* : Ribaucourt, 1896 (lapsus)]; *chlorotica curiosa* Ribaucourt, 1896; *hortensis* Bretscher, 1901 [non *hortensis* Michaelsen, 1890], *chlorotica kosovensis* Sapkarev, 1975 (non *Allolobophora kosowensis* Karaman, 1968 *sic*)]. From Iceland and Greenland (Gates, 1972: 70).

2. *Aporrectodea caliginosa caliginosa* (Savigny, 1826) [syns. *carneum* Savigny, 1826 (non Friend, 1911); *lividus* Templeton, 1836; *gordianus* Templeton, 1836; *purus* Dugès, 1837; *communis cyaneus* Hoffmeister, 1845 [non *cyaneum* Savigny, 1826 (= *Octolasion cyaneum*)]; *?helenae* Kinberg, 1867: 98; *hortensiae* Kinberg, 1867: 98; *novaehollandiae* Kinberg, 1867; *communis olivaceus* Eisen, 1871; *communis pellucidus* Eisen, 1871 [non *pellucidus* Templeton, 1834]; *turgida turgida* Eisen, 1873: 46 [sometimes date (mis)quoted as "1874"]; *turgida tuberculata* Eisen, 1874: 43; *levis* Hutton, 1877; *australiensis* Fletcher, 1886; *borellii* Cognetti, 1904; *similis* Friend, 1910; *remyi* Cernosvitov, 1929 (sometimes miscited as "1931"); *caliginosa hellenica* Tzelepe, 1943; *nocturna* Evans, 1946 [?= *A. giardi* (cf. *A. longa*); sometimes misspelt "*noctunus*"; *arnoldi* Gates, 1952; *molita* Gates, 1952; *Nicodrilus caliginosus caliginosus paratypicus* Bouché, 1972 (invalid varietal name); *Nicodrilus monticola* (sic) Pérez-Onteniente & Rodríguez Babio, 2002: 517; *N. carochensis* Pérez-Onteniente & Rodríguez Babio, 2002: 520; *N. tetramammalis* Pérez-Onteniente & Rodríguez Babio, 2002: 521. Note: some North American authors attempt to retain the name *turgida* Eisen, 1873 in preference to the prior *caliginosa* Savigny, 1826 on the grounds that Savigny's species was inadequately defined, however its name was validated by the restriction and usage by other authors, eg. Michaelsen (1900: 482), according to Sims & Gerard (1985; 1999: 44). The names *tuberculata* and *nocturna* are sometimes retained as separate taxa, however, it is also possible that the *nocturna* morph is in the ambit of *Aporrectodea giardi giardi*. And *A. trapezoides* is sometimes placed as a synonym or subspecies of *caliginosa*, but more usually it is maintained separately]. From Iceland (e.g. Backlund, 1949: 5) and Greenland.
  
3. *Aporrectodea longa longa* (Ude, 1885) [syns. *lactea* Friend, 1892; *intermedium* Friend, 1909; miscited as "Ude, 1886" in Qiu & Bouché (1998: 188); *Nicodrilus longus longus ambiguus* Bouché, 1972 and *N. longus longus amplisellus* Bouché, 1972 are invalid varietal names listed in synonymy by Csuzdi (2003)]. Reported from Iceland (e.g. Gudleifsson and Bjarnadottir, 2003).
  
4. *Aporrectodea rosea rosea* (Savigny, 1826) [syns. *mucosa* Eisen, 1874; *aquatilis* Vejdovsky, 1875 [misspelt "*aquatlis*" by Örley, 1885]; *mediterranea* Örley, 1881; *rosea macedonica* Rosa, 1893 [non *Allolobophora macedonica* Sapkarev, 1971 (= *Helodrilus balcanicus*)]; *danielirosai* Ribaucourt, 1896; *alpestris* Bretscher, 1899; *nobilii* Cognetti, 1903; *diomedaes* Cognetti, 1906; *?indicus* Michaelsen, 1907 [this

synonym advocated by Gates (1972: 107) but rejected by Cs. Csuzdi, pers. comm.; cf. genus *Healyella*]; *rosea budensis* Szűts, 1909 [placed in synonymy by Csuzdi & Zicsi (2003: 92)]; *rosea glandulosa* Friend, 1910; *prashadi* Stephenson, 1922; *dairenensis* Kobayashi, 1940: 291; *harbinensis* Kobayashi, 1940: 290; *hataii* Kobayashi, 1940: 288; *jeholensis* Kobayashi, 1940: 293; *rosea paucipartita* Tzelepe, 1943 (sometimes spelt “pauci partita”); *rosea dendrobaenoides* Omodeo, 1950; *jenensis* Fuller, 1953; *moderata* Chekanovskaya, 1959 [author's name misspelt "Csekanovszkaja" in Easton (1983:477)]; *rosea interposita* Plisko, 1965; *Ap. bowcrowensis* Reynolds & Clapperton, 1996: 77 (this latter synonymy by Csuzdi & Zicsi (2003: 93) who misspell the name "bowcowensis" and also note lapsus "bowrcowensis" by Qiu & Bouché, 1998: 187)]. [Note: *rosea* was previously included in *Eisenia* but was officially transferred to the genus *Aporrectodea* by Gates (1976) who earlier (1974) provided about four pages of synonyms, however some authors retain it in *Eisenia* (perhaps due to its anterior dorsal pores?); cf. Qiu & Bouché (1998: 187) who place it in their new genus *Koinodrilus*]. From Iceland (e.g. Gates, 1972: 105).

5. ?*Aporrectodea tuberculata* Eisen, 1874: 43 [see *Ap. caliginosa*]. Reported from Iceland (e.g. by Reynolds, 1977).
6. ***Bimastos parvus*** (Eisen, 1874: 46) [syns. *beddardi* Michaelsen, 1894 (non Ribaucourt, 1896); *parva udei* Ribaucourt, 1896 (non Sapkarev, 1972 = *Serbiona jonesapkarevi* Blakemore, 2004: 78; nec Sapkarev, 1991 = *Allolobophora dofleini josapi* Blakemore, 2006); *consticta geminata* Friend, 1897; ?*longicinctus* Smith & Gittins, 1915: 548]. [Note: this taxon recently transferred from *Allolobophoridella* to *Bimastos* although sometimes still reported as *Allolobophora parva* or *Eisenia parva* and some authors revoke the probable *beddardi* and possible *longicinctus* synonyms]. Reported from Iceland (e.g. Gates, 1972: 87).
7. ***Dendrobaena hortensis*** (Michaelsen, 1890: 15) (syns. *hibernica* Friend, 1892; *veneta tepidaria* Friend, 1904; *veneta dendroidea* Friend, 1909; *Allolobophora veneta robusta* Friend, 1909 [a permanently invalid primary homonym of *Allolobophora robusta* Rosa, 1895 under ICZN (1999) that is not replaced as valid synonyms exist]; *birsteini* Malevics, 1947; *nicaensis* Vedovini, 1971; *pseudohortensis* Sapkarev, 1976. Note: originally described as *Allolobophora subrubicunda forma hortensis*, although cited as *E veneta* var. *hortensis* in

- Michaelsen (1900: 477); some authors mistake Michaelsen's publication date as "1889" or as "1907" when he described the unrelated *Notoscolex hortensis*]. From Iceland (Gates, 1972: 104).
8. ***Dendrobaena octaedra octaedra*** (Savigny, 1826) (originally *Enterion octaedrum*, syns. *vetaedrus* (laps.): Duges, 1837; *octoedra* (laps.): Rosa, 1887; *flaviventris* Leuckart, 1849; *boeckii* Eisen, 1873/4; *camerani* Rosa, 1882; *octaedra alpinula* Ribaucourt, 1896; *octaedra liliputiana* Ribaucourt, 1896; *octaedrus casterinensis* Chinaglia, 1911; *octaedra quadrivesiculata* Pop, 1938). From Iceland and Grimsey Island; Greenland (the commonest species) and Disko Island (Gates, 1972: 90; Hansen *et al.*, 2006).
  9. ***Dendrodrilus rubidus norvegicus*** (Eisen, 1874: 48) [non *norvegica* Bretscher, 1899 (= *Ap. handlirschi*)]. From Greenland (e.g. by Omodeo, 1957: 14; Stop-Bowitz, 1969: 234).
  10. ***Dendrodrilus rubidus rubidus*** (Savigny, 1826) [syns. *xanthurus* Templeton, 1836; *puter* Hoffmeister, 1845; *pieter* Udekem, 1865; *havaicus* Kinberg, 1867 (sometimes misspelt *Hypogaeon "havaicum"*); *victoris* Perrier, 1872; *arborea* Eisen, 1874; *constricta* Rosa, 1884; *darwini* Ribaucourt, 1896; *putris subrubicunda* var. *helvetica* Ribaucourt, 1896; *magnesa* Tzelepe, 1943]. From Iceland and Grimsey Island; Greenland and Disko Island (Gates, 1972: 93). Chromosome numbers in Greenland and North Iceland  $6n=102$ ; in South and Western Iceland in  $2n=34$ .
  11. ***Dendrodrilus rubidus subrubicundus*** (Eisen, 1874: 51) [syns. ?*valdiviensis* Blanchard, 1849 this taxon would possibly compete for priority, cf. *De. r. rubidus*; *fraissei* Örley, 1881; *putris dieppi* Ribaucourt, 1901; ?*arborea pygmaea* Friend, 1923 [non *pygmaeum* Savigny, 1826]; *subrubicunda* var. *papillosa* Pop, 1938 [non *Lumbricus papillosus* Friend, 1893]; *rivulicola* Chandebouis, 1958. Note: Michaelsen (1891: 3) misidentified this taxon as *A. nordenskiöldii* according to Michaelsen (1900: 491) although in this latter synonymy he also includes *darwini* and *helvetica* under *rubidus subrubicundus* (cf. *De. rubidus rubidus*)]. From Iceland (Kunst, 1956).
  12. ***Dendrodrilus rubidus tenuis*** (Eisen, 1874: 44) *species incertae sedis* [for some reason elevated to specific status in Qiu & Bouché, 1998: 195; listed as a subspecies

- of *rubidus* by Easton (1983: 480); placed in synonymy of nominal subspecies in Csuzdi & Zicsi (2003: 132); cf. Omodeo & Rota (2004: 250) who suggest reserving the name *D. rubidus tenuis* for some parthenogenetic forms even though "forms" are strictly invalid under ICZN (1999) code]. From Iceland (e.g. Backlund, 1949: 9).
13. ***Eisenia fetida*** (Savigny, 1826) (syns. *foetida*: Michaelsen, 1900 (illegal emendation); *semifasciatus* Burmeister, 1835; *annularis* Templeton, 1836; *olidus* Hoffmeister, 1842; *luteus* Blanchard, 1849; *rubofasciatus* Baird, 1873; *annulatus* Hutton, 1877 [non Perel, 1975 (= *L. polyphemus*)]; *ruber* Boeck, 1892 (?nom. nud.); *costatus* Grube, 1892 (?nom. nud.); *fetida fimetoria* Örley, 1881 [misspelt "fimetora" by Csuzdi & Zicsi, 2003: 143; non *fimetorum* Fitzinger, 1833]; *nordenskioldi caucasica* Michaelsen, 1902; *fetida attica* Tzelepe, 1943 [misspelt as "athica" by Reynolds & Cook (1976: 73)]; *fasciata* Backlund, 1948; *fetida andrei* Bouché, 1972 nom. nov. pro *E. fetida* var. *unicolor* André, 1963). [Note: *E. fetida andrei*, placed in synonymy by Easton (1983) and Csuzdi & Zicsi (2003: 143) is sometimes given separate specific status, but this is almost arbitrary between authors - see discussion of this in Blakemore (2002)]. From Greenland, Iceland and Spitzbergen (Gates, 1972: 98).
14. ***Eiseniella tetraedra tetraedra*** (Savigny, 1826) [syns. *quadrangularis* Risso, 1826; *amphisbaena* Dugès, 1828; *agilis* Hoffmeister, 1843; *tetraedrus luteus* Eisen, 1871; *tetraedrus obscurus* Eisen, 1871; *dubius* Michaelsen, 1890; *tetragonurus* Friend, 1892; *flavus* Friend, 1893; *macrurus* Friend, 1893; *tetraedrus novis* Ribaucourt, 1896; *tetraedrus bernensis* Ribaucourt, 1896; *tetraedrus infinitesimalis* Ribaucourt, 1896; *tetraedra hammoniensis* Michaelsen, 1909; *mollis* Friend, 1911; *intermedius* (sic) Jackson, 1931 non Cernovitov, 1934 (= *E. tetraedra cerni*); *tetraedra popi* Zicsi, 1960; *tetraedra proporandra* Qiu & Bouché, 1998 - placed in synonymy of *Ei. tetraedra* by Csuzdi & Zicsi (2003: 153)]. From Iceland (Gates, 1972: 109).
15. ***Lumbricus castaneus*** (Savigny, 1826) [syns. *pumilum* Savigny, 1826; *triannularis* Grube, 1851; *minor* Johnston, 1865 (non Pennant, 1766); *josephinae* Kinberg, 1867; *purpureus* Eisen, 1871; *pumilosum* Beddard, 1895 (lapsus); *castaneus morelli* Ribaucourt, 1896; *castaneus perrieri* Ribaucourt, 1896; *brunescens* Bretscher, 1900 (miscited as "brunescene" by Reynolds & Cook, 1976: 82); *castaneus disjunctus* Téry, 1936; *castaneus pictus* Chandebouis, 1957; *castaneus rubelloides* Hidvegi & Josens, 1990/1]. From Iceland including Surtsey Island (Sigurðardóttir, 2000).

16. *Lumbricus rubellus rubellus* Hoffmeister, 1843 (syns. *campestris* Hutton, 1887; *rubellus curticaudatus* Friend, 1892; *rubellus tatrensis* Nusbaum, 1895 [or *alpina tatrensis?*]; *herculeana* Bretscher, 1899; *ribaucourti* Bretscher, 1901; *relictus* Southern, 1909: 169; *rubellus tristani* Pickford, 1932). From Greenland (recorded from a garden) and Iceland (Gates, 1972: 116).
17. *Lumbricus terrestris* Linnaeus, 1758 (syns. *herculeum* Savigny, 1826; *agricola* Hoffmeister, 1842; *infelix* Kinberg, 1867; *americanus* Perrier, 1872; *studerii* Ribaucourt, 1896). From Greenland and Iceland (Gates, 1972: 119).
18. *Octolasion cyaneum* (Savigny, 1826) [non *communis cyaneus* Hoffmeister, 1845 (= *Aporrectodea caliginosa*); syns. *stagnalis* Hoffmeister, 1845; *alyattes* Kinberg, 1867; *studiosa* Michaelsen, 1890; *kempi* Stephenson, 1922; *cyaneum* var. *armoricum* Bouché, 1972]. From Iceland (Backlund, 1949: 13 reported it from Reykjavik).

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[End of Greenland/Iceland Checklist].