

NOTA CIENTÍFICA

Occurrence of introduced species of the genus *Cercyon* (Coleoptera: Hydrophilidae) in the Neotropical Region

FIKÁČEK, Martin

Department of Entomology, National Museum, Kunratice 1, CZ-148 00
Praha 4, Czech Republic; e-mail: mfikacek@seznam.cz
Department of Zoology, Faculty of Science, Charles University in Prague,
Viničná 7,
CZ-128 44 Praha 4, Czech Republic

La presencia de especies exóticas del género *Cercyon* (Coleoptera: Hydrophilidae) en la región Neotropical

■ **RESUMEN.** Se presenta una revisión de las especies exóticas del género *Cercyon* Leach introducidas en la región Neotropical, y dos especies se registran por primera vez para la misma: *Cercyon* (*Paracercyon*) *laminatus* Sharp de Chile y *C.* (s.str.) *haemorrhoidalis* Fabricius de la Argentina. *Cercyon panamensis* Hansen, n. sin., es considerada sinónimo de *C.* (s.str.) *nigriceps* (Marsham). Esta última especie se registra por primera vez para Brasil, Costa Rica, la República Dominicana, Panamá, Paraguay y Trinidad y Tobago, además se mencionan datos adicionales sobre su presencia en Jamaica. *Cercyon depressus* subsp. *uruguayanus* Knisch es considerada sinónimo de *C.* (s.str.) *depressus* Stephens y se designa su lectotipo, esta última especie es registrada por primera vez para Chile. Se exponen registros adicionales de *C.* (s.str.) *quisquilius* (Linnaeus) para México y la Argentina, y se menciona por primera vez la presencia de esta especie en Chile. Se confirma la existencia reciente de *C. praetextatus* (Say) en la Argentina. Se provee una lista de las especies de *Cercyon* introducidas en la región Neotropical. *Cercyon obsoletus* (Gyllenhal) y *C. limbatus* Mannerheim son eliminadas de la fauna Neotropical.

PALABRAS CLAVE. Hydrophilidae. Sphaeridiinae. *Cercyon*. Especies introducidas. Sinonimias. Lectotipo.

■ **ABSTRACT.** The occurrence of the species of the genus *Cercyon* Leach introduced to the Neotropical Region is reviewed. Two species are recorded for the first time from the Neotropics: *Cercyon* (*Paracercyon*) *laminatus* Sharp from Chile, and *C.* (s.str.) *haemorrhoidalis* Fabricius from Argentina. *Cercyon panamensis* Hansen is synonymized with *C.* (s.str.) *nigriceps* (Marsham); the latter species is recorded for the first time from Brazil, Costa Rica, Dominican Republic, Panama, Paraguay and Trinidad and Tobago, additional data are provided on its occurrence in Jamaica. *Cercyon depressus* subsp. *uruguayanus* Knisch is synonymized with *C.* (s.str.) *depressus* Stephens and its lectotype is designed; the latter species is recorded for the first time from Chile. Additional records of *C.* (s.str.) *quisquilius* (Linnaeus) from Mexico and Argentina are provided, and the species is recorded from Chile for the first time. Recent occurrence of *C. praetextatus* (Say) in Argentina is confirmed.

A list of *Cercyon* species introduced to the Neotropical Region is provided, *C. obsoletus* (Gyllenhal) and *C. limbatus* Mannerheim are removed from the Neotropical fauna.

KEY WORDS. Hydrophilidae. Sphaeridiinae. *Cercyon*. Introduced species. New synonyms. Lectotype designation.

The hydrophilid genus *Cercyon* Leach, 1817 comprises at present more than 250 described species distributed worldwide (Hansen, 1999; Short & Hebauer, 2006) and is therefore the most speciose genus of the subfamily Sphaeridiinae. Most representatives of the genus are terrestrial, living in various kinds of decaying organic matter, most frequently in leaf litter and in excrements of various vertebrates. A few species of the genus are common in synanthropic habitats (e.g. associated with livestock, pastures, farms, and other agricultural settings) and are therefore easily introduced to different parts of the world. Other species inhabit beach wrack and seaweed on the sea coast and are therefore also infrequently spread by shipping.

Altogether 16 species of *Cercyon* were introduced by man out of their original distribution area (Hansen, 1999). The vast majority of them are originally distributed in Europe or in the Palaearctic Region. In North America, 11 species of alien *Cercyon* species occur (Smetana, 1978), which represents ca. 28% of the local *Cercyon* fauna. In other areas (Australia, New Zealand, some islands in the Pacific and Indian Oceans), there are no native species of the genus *Cercyon* or closely related genera, except for introduced species. For many of these introduced taxa, there is too little data to determine whether or not they have established themselves or are more ephemeral populations resulting from repeated and/or short-lived introductions. The fauna of the terrestrial hydrophilids of the Neotropical Region is rather unknown at present, and the last comprehensive work covering at least its northern part (i.e., Central America) was published more than 100 years ago (Sharp, 1882). Recently, I started to examine type specimens as well

as unidentified material of Neotropical Sphaeridiinae in order to prepare taxonomic revisions documenting their high diversity. Among this material, I have found also representatives of the introduced *Cercyon* species, which were not yet recorded from the Neotropical Region or were described as separate species or subspecies endemic to the Neotropics. These data along with the formal synonymization of respective species are presented in this paper. In addition, I include also the faunistic data documenting the recent or repetitive occurrence of some species which confirm the successful establishment of these species in the Neotropical Region.

Type specimens examined were dissected, genitalia were placed in a drop of the water-soluble dimethyl hydantoin formaldehyde resin (DMHF) on the same label as the beetle or on the transparent plastic label attached below the beetle. Label data of type specimens are cited verbatim, using a slash (/) for dividing different rows of the same label, and a double-slash (//) for dividing separate labels. Label data of non-type specimens are adapted to the common form, notes added by the author are enclosed in the brackets. All material except for the specimen of *C. haemorrhoidalis* was identified by the author.

Studied material is deposited in the following institutions: BMNH – Natural History Museum, London, Great Britain; CNC – Canadian National Collection, Ottawa, Canada; FHFG – coll. F. Hebauer, Plattling, Germany; INBIO – Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica; IRSN – Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium; MACN – Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina (coll.

C. Bruch); MAEA – coll. M. Archangelsky, Facultad de Ciencias Naturales, Universidad Nacional de La Patagonia «San Juan Bosco», Esquel, Argentina; NHMW – Naturhistorisches Museum, Wien, Austria; NMPC – National Museum, Praha, Czech Republic; ZMUC – Zoological Museum, University of Copenhagen, Denmark.

Taxonomy and faunistic records

Cercyon (Paracycreon) laminatus Sharp, 1873.

Material examined. CHILE. Araucanía Region: Termas de Tolhuaca, 38 14.162°S 71 44.027°W, 900 m a.s.l., 12.-14.ii.2005, 1 spec., S. Bíl lgt (NMPC).

Bionomics and distribution. A terrestrial species inhabiting various kinds of decaying organic matter and excrements of various mammals; most frequently collected at light. Originally distributed in the Eastern Palaearctic Region (Japan, Russian Far East, China), it was introduced and well-established in Europe in the middle of 20th century (e.g., Boukal *et al.*, 2008). In the beginning of 20th century, it was introduced also to the Hawaiian Islands, where it has been recorded from most islands up to present (Hansen, 1995), and recently it was collected also in Australia (Queensland; M. Fikáček, unpubl. data). The above mentioned specimen was collected at light (S. Bílý, pers. comm.). **The first record for the Neotropical Region.**

Cercyon (Cercyon) depressus Stephens, 1829.

Cercyon depressus subsp. *uruguayanus* Knisch, 1924, **syn. nov.**

Type material examined. *Cercyon depressus* ssp. *uruguayanus*: Lectotype (hereby designated), 1 male (IRSN): “Montevideo / 22.XII.08 / (á la lámpara) // J. Tremoleras / don. 1922 // Knisch det. 1922 / subsp. uru- / guyanus m. // Coll. A. Knisch / TYPUS // LECTOTYPE / *Cercyon depressus* / subsp. *uruguayanus* / Knisch, 1924 / M. Fikáček design. 2008”. **Note:** Original description by Knisch (1924) is based on two specimens without designation of the

holotype; in the collection of IRSN, I found only one male specimen mentioned above which I hereby designate as the lectotype.

Additional material examined. CHILE. Los Lagos Region: Chaiten, rocky beach drift, 31.i.1985, 3 spec., S. & J. Peck (ZMUC); Puerto Montt, Pilluco, sifted beach drift, 24.xii.1984, 1 male, 1 spec., S. & J. Peck (ZMUC, NMPC).

Comments. Knisch (1924) diagnosed *C. depressus* ssp. *uruguayanus* as follows: “besides the rather minute differences in sculpture, it differs from the European nominal form [i.e., *C. depressus*] only by the reddish brown coloration of pronotum and elytra present even in completely sclerotized specimens” (translated from the German original by the author). The comparison of the type specimen with *C. depressus* (non-type specimens from Germany (Schleswig-Holstein) and Denmark, all deposited in NMPC) shows that *C. depressus* ssp. *uruguayanus* completely corresponds to *C. depressus* in external morphology as well as in morphology of male genitalia. Male genitalia of the above type specimen are weakly sclerotized, indicating that the specimen is teneral. The paler coloration of the type specimen is therefore caused by incomplete sclerotization, rather than representing a differential character. For these reasons, *C. depressus* subsp. *uruguayanus* is treated as a junior synonym of *C. depressus*.

Bionomics and distribution. A European species found on sea beaches under decomposing seaweed and other kinds of detritus or under stones (Smetana, 1978; Hansen, 1987). It was introduced to North America (both on Atlantic and Pacific coasts) at the beginning of 20th century (Smetana, 1978). Based on the above mentioned type specimen, it was introduced to Atlantic coast of South America at about the same period. Except for this specimen, only the mentioned specimens from Pacific coast (Chile) are known. Kuschel (1990) recorded this species also from New Zealand (Auckland), Bameul *et al.* (1990) from New Amsterdam Island in the Indian Ocean, and Brinck (1948) from the island of Tristan da Cunha in southern Atlantic Ocean. **Confirmation of the**

occurrence of *C. depressus* in Uruguay, first record for Chile.

Cercyon (Cercyon) haemorrhoidalis Fabricius, 1775.

Material examined. ARGENTINA. Córdoba Province: Arroyo Las Mojarras, N of San Roque Lake, at light, without date, 1 spec. M. Archangelsky lgt. et det. (MAEA).

Bionomics and distribution. Terrestrial species inhabiting excrements of various herbivorous mammals as well as other kinds of decaying organic matter (rotting plant debris, compost piles, carrion), also recorded from nests of birds and small rodents (Smetana, 1978; Hansen, 1987; M. Fikáček, unpubl. data). Originally widely distributed through the western Palaearctic Region (Hansen, 1999), introduced and well-established in North America (Smetana, 1978), Australia (Hansen, 1999; Doube & Wardhaugh, 1991) and New Zealand (Kuschel, 1990; M. Fikáček, unpubl. data). d'Orchymont (1926) recorded one specimen also from the Philippines. **The first record for the Neotropical Region.**

Cercyon (Cercyon) nigriceps (Marshall, 1802)

Cercyon striatus Sharp, 1882, **syn. nov.**

Cercyon panamensis Hansen, 1999 (replacement name of *C. striatus* Sharp), **syn. nov.**

Type material examined. *Cercyon striatus*: Holotype, 1 male (BMNH): "Cercyon striatus / D. S. / Panama V. de Chir / iqui, 3000-4000ft / Champion [handwritten, on label with beetle] // V. de Chiriqui / 25-4000ft / Champion // Sharp Coll. / 1905 - 313 // B. C. A. Col. I. 2 / Cercyon / striatus / Sharp".

Additional material examined. COSTA RICA: Alajuela Province: Cano Negro, R. N. V. S. Cano Negro, 20 m a.s.l., 14-30.xi.1992, 2 spec., K. Martinez lgt. (INBIO). JAMAICA. Try., Good Hope, 11.viii.1966, 1 male, H. F. Howden lgt.; Try., Duncans, 21.viii.1966, 3 spec., Howden & Becker lgt.; same label data: 22.viii.1966, 2 spec., 19.viii.1966, 1 spec., 3.viii.1966, 1 spec.,

16.viii.1966, 1 spec., 11.viii.1966, 1 spec (all in CNC). DOMINICAN REPUBLIC. Pedernales, 4 km W of Oviedo, arid thorn forest, flight intercept trap, 10 m a.s.l. (locality #91-344), 28.xi.-4.xii.1991, 2 spec., L. Masner & S. Peck lgt. (ZMUC). TRINIDAD & TOBAGO. Tobago Island: Buccoo Village, 15.-16.v.1993, 3 spec., Seyfert leg. (NHMW). BRAZIL. Pará State: Tucuruí, 49 40'W, 3 45'S, flight intercept trap, carrion and dung, 13.-21.iv.1985, N Degallier lgt., 1 spec. (ZMUC). PARAGUAY. Paraguari Department: Sapucay, 18.vi.1994, 1 female, Drechsel leg. (NHMW). Cordillera Department: Emboscada, Rio Salado, 27.vii.1991, 1 male, 2 spec., U. Drechsel leg., (NHMW). Misiones Department: Ayolas, 22.viii.1992, 2 spec., U. Drechsel leg. (NHMW). Concepción Department: Santa Sofia, without date, 1 spec., Reimoser leg. (NHMW). ARGENTINA: Buenos Aires province: without detailed locality, 13.iv.1905, 1 spec., C. Bruch lgt. (MACN).

Comments. Sharp (1882) described *C. striatus* on the basis of one teneral specimen from Panama, which he compared with Neotropical species *C. subsignatus* Sharp, 1882 and *C. armatus* Sharp, 1882. Hansen (1999) recognized that *Cercyon striatus* is a secondary homonym of *Hydrophilus striatus* Turton, 1802 (= *Cercyon haemorrhoidalis* Fabricius, 1775) and introduced a new replacement name *C. panamensis* Hansen, 1999 for this species. Examination of the type specimen of *C. striatus* Sharp shows that this species completely corresponds to *C. nigriceps* in external morphology and morphology of male genitalia. For that reason, *C. striatus* Sharp and *C. panamensis* are considered as junior synonyms of *C. nigriceps*.

Bionomics and distribution. A terrestrial species collected in decaying plant matter (e.g., compost piles) and herbivore excrement. It is a cosmopolitan species presently distributed in all zoogeographical regions (Hansen, 1999). Original distribution is unknown, but the presence of closely related undescribed species in Afrotropical and Palaearctic Regions (Fikáček, unpubl. data; Ryndevich & Hebauer, pers. comm.)

suggest that it originally comes from the Old World. By mid of 19th century, the species was introduced to Atlantic coast of North America, and at the end of the 19th century also to its Pacific coast (Smetana, 1978). Based on the type specimen of *C. striatus* Sharp, it seems that *C. nigriceps* was introduced to Central America prior to 1880. At present, the species seems to be widely distributed in West Indies and South America. Additional records listed above confirm its occurrence in Jamaica and represent **first records of *C. nigriceps* for Costa Rica, Panama, the Dominican Republic, Trinidad and Tobago, Brazil and Paraguay.**

Cercyon (Cercyon) praetextatus (Say, 1825)

Material examined. ARGENTINA: **Entre Rios Province:** Colón, xi.1988, 3 spec., Liebig lgt. (FHPC, NMPC); same locality and collector, 14.iv.1989, 1 spec. (FHPC).

Bionomics and distribution. A widely distributed New World species inhabiting various kinds of decaying plant matter, reaching from southern Canada throughout the U.S.A. into Central America (Mexico, Guatemala, Costa Rica) and West Indies (Cuba, Jamaica) (Smetana, 1978; Spangler, 1981; Hansen, 1999; Fikáček, unpubl. data). It seems therefore likely to be native in the northern part of the Neotropical Region. d'Orchymont (1939) mentioned this species from Argentina on the basis of specimens collected in Tigre near Buenos Aires City. In the present paper I provide recent records confirming its occurrence in Argentina. As the species is missing from South America, its occurrence in Argentina seems to represent an introduction. **Confirmation of its occurrence in Argentina.**

Cercyon (Cercyon) quisquilius (Linnaeus, 1761)

Material examined. MEXICO: **Coahuila State:** Boquillas del Carmen, 1850' [= 560 m], 23.v.1959, 1 spec., Howden & Becker lgt. (CNC). **Nuevo León**

State: 5 miles S of Monterrey, 9.vii.1963, 1 spec., H. F. Howden lgt. (CNC). **Chihuahua State:** Majalca Rd., 5500' [= 1680 m], 30 miles NW of Chihuahua, 14-17.iv.1961, 1 spec., Howden & Martin lgt. (CNC); Majalca Road, 5000' [= 1500 m], 30 miles NW of Chihuahua, 17.iv.1961, 1 spec., Howden & Martin lgt., (CNC). **Sonora State:** 16 miles NE of Ciudad Obregón, 13-14.v.1961, 1 spec., Howden & Martin lgt. (CNC). **Oaxaca State:** Pueblo Nuevo, at black light, 1590 m a.s.l., 1-12.viii.1986, 1 spec., H. & A. Howden lgt. (ZMUC). **ARGENTINA. Buenos Aires Province:** without additional data, 4 spec., lgt. C. Bruch (MACN); same data, 13.xii.1891, 1 male, 1 spec., C. Bruch lgt. (MACN); same data, 25.ix.1909, 1 female, C. Bruch lgt. (MACN). **Córdoba Province:** Alta Gracia, La Granja, Sierras de Córdoba, xii.1892, 1 female, C. Bruch lgt. (MACN). **Mendoza Province:** Chilecito, without additional data, 2 females (MACN). **Río Negro Province:** Río Colorado, without additional data, 1 male, originally identified as *C. fulvipennis* (MACN); without additional data, 1 male, 1 female, originally identified as *C. fulvipennis* by A. Knisch (MACN). **Salta Province:** Cachi, 86 km NW of Salta, 25 07'19"S 66 09'31"W, 2340 m a.s.l., 12.ii.2004, 1 male, 2 unsexed specimens, M. Fikáček lgt. (NMPC). **San Luis Province:** 18 km S Arizona, 18-23.i.1982, 250 m, 1 spec., Howden lgt. (CNC); without additional data, 1 female, C. Bruch lgt. (MACN). **San Juan Province:** Calingasta [= Calingasta], 19.-20.i.1995, 1 spec., without collector data (NHMW). **Neuquén Province:** Junín de los Andes env., 39 53'41"S 71 08'53"W, 780-820 m a.s.l., 2 specimens, M. Fikáček lgt. (NMPC). **CHILE: Biobío Region:** Las Trancas, 70 km E Chillan, 1400m, 13-14. xii.1976, 1 spec., H. F. Howden lgt. (CNC). **Aisén Region:** Cisnes to Las Juntas, forest & pasture, cer netting, 30.xii.1984, 1 spec., S. & J. Peck lgt. (ZMUC). **Santiago Region:** La Obra E of Santiago de Chile, x.1954, 12 spec., L. E. Peña lgt. (CNC); Riconada, Maipú, 8-9.v.1959, 1 spec., L. E. Peña lgt. (CNC).

Bionomics and distribution. A widespread Palaearctic species, inhabiting excrements of various herbivorous mammals

and other kinds of decaying organic matter. The species was introduced to North America around the year 1920 and it is widely distributed from southern Canada to northern Mexico at present (Smetana, 1978; Mexican records mentioned by this author probably refer partly to the specimens listed above). In South America the species was recorded for the first time by Bruch (1915) from Argentina, the records of *C. fulvipennis* Mannerheim, 1852 mentioned by Bruch (1927) also concern this species (see below for details). Records listed above confirm the occurrence of *C. quisquilius* in Mexico and Argentina and represent **the first records of *C. quisquilius* for Chile.**

List of the alien *Cercyon* introduced to the Neotropical region

- Sg. *Paracycreon* d'Orchymont
Cercyon laminatus Sharp
 Chile (this paper)
- Sg. *Cercyon* s.str.
Cercyon depressus Stephens
 Uruguay, Chile (this paper)
- Cercyon haemorrhoidalis* Fabricius
 Argentina (this paper)
- Cercyon inquinatus* Wollaston
 Brazil (Bameul, 1986)
- Cercyon nigriceps* (Marsham)
 Costa Rica, Panama, Jamaica, Dominican Republic (all this paper), Guadeloupe (Blackwelder, 1944); Trinidad & Tobago, Brazil, Paraguay (this paper), Argentina (Bruch, 1927; this paper)
- Cercyon praetextatus* (Say)
 Argentina (d'Orchymont, 1939, this paper)
- Cercyon quisquilius* (Linnaeus)
 Mexico (Smetana, 1978; this paper), Jamaica (Blackwelder, 1944), Argentina (Bruch, 1915; this paper), Chile (this paper)

Species removed from the Neotropical fauna

Cercyon (Cercyon) limbatus Mannerheim, 1843

Bruch (1927) listed this species under the synonym *C. fulvipennis* Mannerheim, 1852 from Río Negro Province in Argentina. The record is based on three specimens deposited in C. Bruch collection in MACN, one of which was identified as *C. fulvipennis* by A. Knisch. Reexamination of this material reveals that all three specimens actually belong to *C. quisquilius* (see under this species for locality data). Bruch's (1927) record of *C. fulvipennis* from Argentina is therefore based on a misidentification and *C. limbatus* has to be removed from the Neotropical fauna.

Cercyon (Cercyon) obsoletus (Gyllenhal, 1808)

Hansen (1999) mentioned the possible occurrence of this species in Argentina referring to Bruch (1927). However, only four species of the genus *Cercyon* are listed for Argentina by the latter author: *C. quisquilius*, *C. fulvipennis* (= *C. limbatus*), *C. nigriceps* and *C. variegatus* Sharp, 1882. For this reason, I do not consider *C. obsoletus* to occur in the Neotropical Region and the species is therefore not mentioned in the list above.

ACKNOWLEDGEMENTS

I am obliged to M. Archangelsky (Universidad Nacional de la Patagonia San Juan Bosco, Esquel, Argentina) for providing me with the data on the occurrence of *Cercyon haemorrhoidalis* in Argentina, to P. L. M. Torres (Universidad de Buenos Aires, Argentina) for help with obtaining the literature, translation of the Spanish abstract, and to both latter and A. E. Z. Short (Natural History Museum, University of Kansas) for valuable comments on the manuscript. I am indebted to P. Limbourg (IRSN), M. Barclay

and C. Taylor (both BMNH), A. Roig-Alsina and L. Compagnucci (both MACN), M. A. Jäch (NHMW) and A. Smetana (CNC) for the possibility to study the material deposited in their institutions, and to G. E. Flores (Instituto Argentino de Investigaciones de las Zonas Áridas, Mendoza, Argentina) for his help with formatting of the manuscript as well as with the arranging of the loan from MACN. The preparation of this study was partly supported by the following grants: Charles University Grant Agency (GAUK) 18307/2007/B-Bio/PrF, Ministry of Education of the Czech Republic (MŠMT ČR) No. 0021620828, and Ministry of Culture of the Czech Republic (MK ČR) No. 00002327201. Presented paper contains the results obtained during the following stays supported by a grant from the European Commission's (FP 6) Integrated Infrastructure Initiative programme SYNTHESYS: AT-TAF-105 (NHMW, December 2004), BE-TAF-3609 (IRSN, October 2007) and DK-TAF-5400 (ZMUC, February 2009). The stay in CNC (September 2005) was funded by CANACOLL grant No. 247/2005.

LITERATURE CITED

- BAMEUL, F., Y. FRENOT, M. LÉBOVIER & J. F. VOISIN. 1990. Présence de *Cercyon* (s. str.) *depressus* Stephens dans l'île Amsterdam (Océan Indien) (Col., Hydrophilidae). *Bull. Soc. Ent. France* 94: 308.
- BAMEUL, F. 1986. Les Hydrophilidae des îles Mascareignes (Coleoptera). *Rev. Suisse Zool.* 93: 875-910.
- BLACKWELDER, R. E. 1944. Checklist of the coleopterous insects of Mexico, Central America, the West Indies and South America. Part 1. *Bull. U.S. Nat. Mus.* 185: xii+188 pp.
- BOUKAL, D. S., M. BOUKAL, M. FIKÁČEK, J. HÁJEK, J. KLEČKA, S. SKALICK, J. ŠTASTNÝ & D. TRÁVNÍČEK. 2008. Catalogue of water beetles of the Czech republic (Coleoptera: Sphaeriidae, Gyrinidae, Haliplidae, Noteridae, Hygrobiidae, Dytiscidae, Helophoridae, Georissidae, Hydrochidae, Spercheidae, Hydrophilidae, Hydraenidae, Scirtidae, Elmidae, Dryopidae, Limnichidae, Heteroceridae, Psephenidae). *Klapalekiana* 43(suppl.): 1-289 (in Czech and English).
- BRINCK, P. 1948. Coleoptera of Tristan da Cunha. *Results of the Norwegian Scientific Expedition to Tristan da Cunha 1937-1938* 17: 1-121.
- BRUCH, C. 1915. Catálogo sistemático de los Coleópteros de la República Argentina. Pars II. *Rev. Mus. La Plata* 19: 471-526.
- BRUCH, C. 1927. Suplemento al catálogo sistemático de los Coleópteros de la República Argentina. II (Addenda, corrigenda y lista de especies). *Physis* 8: 536-553.
- DOUBE, B. M. & WARDHAUGH, K. G. 1991. Habitat associations and niche partitioning in an island dung beetle community. *Acta Oecologica* 12: 451-459.
- FABRICIUS, J. C. 1775. *Systema entomologiae*. Libraria Korte, Flensburg & Lipsia, 32 + 832 pp.
- GYLLENHAL, L. 1808. *Insecta Suecica. Volume 1, pars 1*. F. J. Leverentz, Scaris, 572 pp.
- HANSEN, M. 1987. The Hydrophiloidea (Coleoptera) of Fennoscandia and Denmark. *Fauna Ent. Scand.* 18: 1-254.
- HANSEN, M. 1995. A review of the Hawaiian Hydrophilidae (Coleoptera). *Pac. Science* 49: 266-288.
- HANSEN, M. 1999. Hydrophiloidea (s.str.) (Coleoptera). *World Catalogue of Insects* 2: 1-416.
- KNISCH, A. 1924. Neue neotropische Palpicornier (Col. Hydrophilidae – Op. 16). *Wien. Ent. Zeit.* 41: 114-140.
- KUSCHEL, G. 1990. Beetles in a suburban environment: a New Zealand case study – the identity and status of Coleoptera in the natural and modified habitats of Lynfield, Auckland (1974-1989). *DSIR Plant Protection Report* 3: 1-118.
- LEACH, W. E. 1817. *The zoological miscellany. Vol. 3*. R. P. Nodder, London, 151 pp.
- LINNAEUS, C. 1761. *Fauna Svecica* (2nd edition). Laurentius Salvius, Stockholm, 46 + 578 pp.
- MANNERHEIM, C. G. 1843. Beitrag zur Käfer-Fauna der Aleutischen Inseln, der Insel Sitkha und Neu-Californiens. *Bull. Soc. Imp. Nat. Moscou* 16(1): 175-314.
- MARSHAM, T. 1802. *Entomologia Britannica. Vol. 1. Coleoptera*. Wilks et Taylor, London, xxxi + 548 pp.
- D'ORCHYMONT, A. 1926. Notes on Philippine Hydrophilidae. *Philippine J. Sci.* 30: 361-385.
- D'ORCHYMONT, A. 1939. Notes sur quelques Palpicornia de la République Argentine. *Rev. Soc. Entomol. Argent.* 10: 253-264.
- SAY, T. 1825. Descriptions of new species of Coleopterous insects inhabiting the United States. *Journ. Ac. Nat. Sci. Philadelphia* 5(1): 160-204.
- SHARP, D. 1873. The water beetles of Japan. *Trans. Ent. Soc. London* (1873): 45-67.
- SHARP, D. 1882. Insecta. Coleoptera. Vol. 1, part 2 (Haliplidae, Dytiscidae, Gyrinidae, Hydrophilidae, Heteroceridae, Parnidae, Georissidae, Cyathoceridae, Staphylinidae). In: Godman, F. D. & O. Salvin (eds.), *Biologia Centrali-Americana* (16). Taylor & Francis, London, xv+824 pp.
- SHORT, A. E. Z. & F. HEBAUER. 2006. World catalogue of Hydrophiloidea - additions and corrections, 1 (1999-2005) (Coleoptera). *Kol. Rundsch.* 76: 315-359.
- SMETANA, A. 1978. Revision of the subfamily Sphaeriinae of America north of Mexico. *Mem. ent. Soc. Canada* 105: 1-292.
- SPANGLER, P. J. 1981. Supplement to the aquatic and semiaquatic Coleoptera of Cuba collected by the Biospeological Expeditions to Cuba by Academics of Science of Cuba and Romania. *Résultats des Expéditions Biospéologiques Cubano-Roumaine a Cuba* 3: 145-171.
- STEPHENS, J. F. 1829. *Illustrations of British Entomology. Mandibulata. Vol. 2*. Baldwin and Cradock, London, 200 pp.
- TURTON, W. 1802. *A general system of nature through the three grand kingdoms, translated from Gmelin's last edition of the celebrated Systema Naturae by Sir Charles Linné. Volume 2*. Lackington, Allen and Co., London, 717 pp.