



Title	Taxonomic studies on Hydrophilidae and other coleoptera residing in temporally limited heterotrophic systems [an abstract of dissertation and a summary of dissertation review]
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# 学位論文内容の要旨

博士の専攻分野名称: 博士 (農学)

氏名: Suzumura, Alyssa Lee

学位論文題名

Taxonomic studies on Hydrophilidae and other coleoptera residing in temporally limited heterotrophic systems

(腐敗・分解有機物環境に生息する甲虫類の分類学的研究)

Measurement of biodiversity is important for understanding the health of ecological systems and how they change over time. Classification, naming, and identification of species provides a framework for analyzing biodiversity both quantitatively and qualitatively and the taxonomy of species specializing in heterotrophic systems is useful for analyzing processes of decomposition and nutrient cycling. Terrestrial hydrophilid beetles are common inhabitants of these habitats and play important roles in the decomposition of dung, carcasses, seaweed, and other decaying materials. This thesis collects studies on hydrophilids as well as two other families of beetles (Byrrhidae, Tenebrionidae) living in heterotrophic systems.

## **1. Revision of the Asian species of *Sphaeridium* Fabricius, 1775 (Coleoptera: Hydrophilidae)**

19 species of the Hydrophilid genus *Sphaeridium* occurring in the Palearctic and Oriental regions of Asia and Europe are comprehensively revised. The morphology of the genus is analyzed and illustrated in detail and all species lacking recent description are redescribed, and photographs, SEM images, and illustrations of male genitalia are provided for all species except for *S. daemonicum* Fikáček and Kopráček, 2015 (which was comprehensively described recently), *S. flavomaculatum* Orchymont, 1924 (redescribed recently), and *S. kolleri* Orchymont, 1925 (only photographs provided). As a result of redescription, two new species are described, 19 new country records and 10 new regional records are recorded, and 10 species groups are proposed. Additionally a key to species is provided.

## **2. Revision of the beach dwelling *Cercyon* Leach 1817 (Coleoptera: Hydrophilidae) of Pacific Shorelines**

Members of the genus *Cercyon* specializing in beach habitats of Pacific coasts are revised including species occurring in both the west coast of North America and the far east. A key to all species as well as redescription of species not recently treated, habitus photos, SEM images, and illustrations of male genitalia are provided for all species and illustrations of metafurcae

and female genitalia are provided for species occurring in the far east. The transpacific distribution of the species *C. dux* Sharp, 1873 and *C. setulosus* Sharp, 1884 and the possibility of long-distance dispersal via debris generated during the 2011 Tohoku earthquake disaster are discussed.

### **3. Terrestrial hydrophilids (Coleoptera) collected from a fallen nest of the giant honeybee**

#### ***Apis dorsata dorsata* at Bogor Botanical garden, West Java, Indonesia**

Beetles were collected from a fallen comb from the nest of the giant honey bee *Apis dorsata dorsata* in the Bogor Botanical Garden, West Java, Indonesia. 11 species of hydrophilids in 6 genera, *Dactylosternum* Wollaston, 1854, *Protosternum* Sharp, 1890, *Noteropagus* Orchymont, 1919, *Paroosternum* Scott, 1913, *Cercyon* Leach, 1817, and *Pachysternum* Motschulsky, 1863, were identified. Species lacking recent treatment were redescribed and habitus photos and SEM images are provided and male genitalia is illustrated for *N. obliquus* Orchymont, 1925, *Cercyon* (*Clinocercyon*) sp. 1, and *Cercyon* sp. 3. Both species of *Noteropagus* are newly recorded from Java. This is the first record of Hydrophilidae living in discarded honeybee comb.

### **4. Records of the introduced Australian genus *Microchaetes* Hope, 1834 (Coleoptera: Byrrhidae) in Japan with a new prefectural record from Miyazaki**

Records of the introduced Australian genus of pill beetle (Byrrhidae) are compiled from Japanese and international journal articles including a new prefectural record from Miyazaki. Habitus photos and illustrations of the male genitalia are provided.

### **5. Revision of the northern Pacific genus *Phaleromela* Reitter, 1916 (Coleoptera: Tenebrionidae)**

Three species of the genus *Phaleromela* found in North Pacific coastal regions, *P. picta* Mannerheim, 1843, *P. subhumeralis* Reitter, 1916, and *P. variegata* Triplehorn, 1961, are comprehensively redescribed with habitus and SEM photos and illustrations of genitalia and other diagnostic characters as well as updated distribution data. The ecology and biogeography of these species is also briefly discussed.

### **6. Conclusions**

This thesis serves to fill in gaps in the taxonomic understanding of hydrophilids and other beetles specializing in heterotrophic systems and provides diagnostic tools that can be utilized for species identification in further natural history and ecological research on these habitats.