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Aquatic Annelida of Illinois: Introduction and Checklist of Species

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ABSTRACT

This paper represents the first comprehensive review of aquatic Annelida in Illinois. A literature review, a current classification scheme, and a checklist of species are provided for 15 families, 71 genera, and 129 species of freshwater Annelida known to occur in the state. Eight species are reported here as new records for Illinois.

Key words: Acanthobdellida, Aclitellata, Acolosomatidae, Annelida, Aphanoneura, Bdellodrilidae, Branchiobdellida, Branchiobdellidae, Cambarincolidae, checklist, Clitellata, distribution, Enchytracidae, Erpobdellidae, freshwater, Glossiphoniidae, Haplotaxidae, Hirudinea, Hirudinidae, Illinois, leeches, literature review, Lumbricidae, Lumbriculidae, Naididae, Oligochaeta, Piscicolidae, Polychaeta, Sparganophilidae, Tubificidae, worms.

INTRODUCTION

The inland waters of Illinois offer aquatic macroinvertebrates a variety of habitats, including springs, seeps, swamps, marshes, ponds, lakes, reservoirs, streams, and large river systems. A review of the literature concerning benthic biology in Illinois reveals discrepancies in levels of taxonomic information for aquatic macroinvertebrates. Historical and modern-day studies addressing the systematics, distribution, and ecology of mammals, birds, fishes, amphibians, reptiles, mollusks, and arthropods of Illinois are well established in the scientific literature. Few studies, however, have reported the presence of aquatic Annelida at levels other than class or family.

Because annelids, particularly the oligochaetes, are an important component of the benthic community in nearly every aquatic habitat, the limited knowledge of this group in Illinois is surprising. The purpose of this paper is twofold: to present a preliminary checklist of species of aquatic annelids currently known to occur in this state, and to provide a baseline for additional work on the freshwater annelid fauna of the Midwest.

Sources of this information include records documented in the literature, unpublished records of over 150,000 specimens I have identified and deposited in the Illinois Natural History Survey (INHS) Annelid Collection, and records resulting from specimens

forwarded to the INHS for verification. I made no decision concerning the validity of the identifications noted in the literature. Unpublished records and specimens held in the collections of individuals and private companies have not yet been verified and are not included in this paper. Methods used in the collection, preservation, and identification of annelid specimens, pertinent distributional and ecological information, an annotated bibliography, and keys to Illinois species will be presented in a subsequent paper.

LITERATURE REVIEW

The systematics and consequently the distributional and ecological data on aquatic Annelida in North America were disorganized and scattered through the literature prior to the 1960s. Following his early organizational research on aquatic oligochaetes in Great Britain, Dr. R. O. Brinkhurst (1964, 1965, 1966a, 1966b; Brinkhurst and Cook, 1966) published several papers addressing the systematics and ecology of aquatic oligochaetes in North America. These works were followed by the treatise *Aquatic Oligochaeta of the World* (Brinkhurst and Jamieson, 1971). Most North American annelid research prior to 1980 centered on the Laurentian Great Lakes, which encompass over 246,000 square kilometers and are some of the largest and deepest freshwater lakes in the world. Spencer (1980) thoroughly reviewed the taxonomy, zoogeography, distribution, and ecology of Great Lakes oligochaete species and current needs for research in this region. Authors describing the aquatic annelids of North America include Klemm (1972a, 1982) for Hirudinea; Brinkhurst and Wetzel (1984) for Oligochaeta; Klemm (1985) for freshwater Polychaeta, Oligochaeta (Naididae and Tubificidae), and Hirudinea; Brinkhurst (1986) for freshwater microdriles; Brinkhurst and Gelder (1991) for Oligochaeta and Branchiobdellida; and Davies (1991) for Hirudinea, Polychaeta, and Acanthobdellida. Although information on the Great Lakes fauna is plentiful, there is a paucity of information, particularly on a state-by-state basis, concerning the aquatic annelids of inland waters. Midwestern states for which recent annelid checklists have been published include Kansas (Klemm et al., 1979; Wetzel, 1982a, 1982b), Michigan (Klemm, 1972b), and Wisconsin (Howmiller and Loden, 1976).

Early research on aquatic Annelida in Illinois includes work by Forbes (1890), Garman (1890), Smith (1895a, 1895b, 1896, 1900a, 1900b, 1918), Kelly (1899), Brace (1901), Moore (1901), Galloway (1911), Forbes and Richardson (1913), Smith and Welch (1913), Welch (1914), Kindred (1918), Ellis (1919), Richardson (1921a, 1921b, 1925a, 1925b, 1928), Alexander (1925), Thompson (1927), Gersbacher (1937), Evans (1939), and Goodnight (1940). More recent studies presenting limited distributional, ecological, or systematic information on aquatic annelids in Illinois include those by Paloumpis and Starrett (1960), Mathis and Cummings (1971), Nilsen and Larimore (1973), Stimpson et al. (1975), Singer (1977, 1978), Wetzel (1981, 1982c, 1987), Seagle and Wetzel (1982), and Brinkhurst and Wetzel (1984).

CLASSIFICATION OF AQUATIC ANNELIDA

Several classifications for the phylum Annelida recently have been proposed, including those of Jamieson (1978, 1980), Timm (1981), Brinkhurst (1982, 1986, 1988, 1989), Kasprzak (1982, 1984), Parker (1982), Holt (1986, 1989), Erséus (1987), Sawyer (1986a, 1986b, 1986c), Brinkhurst and Nemec (1987), Coates (1987), Brinkhurst and Gelder (1989), and Gelder and Brinkhurst (1990); the reader is directed to these publications for further discussion on the phylogenetic relationships of the annelid groups. This paper

follows the division of the phylum Annelida into two subphyla: the Aclitellata (including the classes Aphanoneura and Polychaeta), and the Clitellata (including the classes Acanthobdellida, Branchiobdellida, Oligochaeta, and Hirudinea). The relationship of the Aphanoneura to the Polychaeta, however, remains unresolved. Nomenclature follows Reynolds and Cook (1976, 1981, 1989) for Aeolosomatidae and Oligochaeta; Klemm (1985) for Acanthobdellida and Polychaeta; Klemm (1985), Barta and Sawyer (1990), and Jones and Woo (1990) for Hirudinea; and Holt (1986) and Gelder (Univ. Maine at Presque Isle, pers. comm.) for Branchiobdellida.

Aphanoneura. The families Aeolosomatidae and Potamodrilidae were placed in the subclass Aphanoneura by Timm (1981). Brinkhurst (1982) then elevated this subclass to a class, maintaining parity with the class Oligochaeta while noting that the Oligochaeta and Hirudinea both are often considered to be subclasses of the Clitellata (Brinkhurst and Wetzel, 1984). Singer (1977, 1978) addressed the biology, ecology, physiology, and systematics of the aeolosomatids and discussed their phylogenetic affinities with other annelids. It will suffice to say that the taxonomy of the species of *Aeolosoma* currently needs attention. Members of the family Acolosomatidae are widely distributed in the Midwest, although the difficulties encountered in the study of this family have restricted the documentation of species. In light of the existing taxonomic and systematic difficulties encountered by Singer (1977) and others, 11 nominal species of *Aeolosoma* are recognized as occurring in North America; at least three of these have been collected in Illinois.

Polychaeta. Of the 85 families of polychaetes known to occur worldwide, only 10 contain freshwater species. Four families, including eight genera and ten species, are reported from North America. Of these, only one species, *Manayunkia speciosa*, has been reported from the Great Lakes system (upper St. Lawrence River, Lake Ontario, Lake St. Clair, and Lake Superior); it has not yet been reported from Lake Michigan or from inland waters of Illinois (Klemm, 1985).

Acanthobdellida. The class Acanthobdellida consists of at least one species of primitive leeches that also possess some oligochaetelike affinities. Acanthobdellidans are permanent parasites of cold-water fishes, especially salmonids and thymallids. The only species occurring in North America, *Acanthobdella peledina,* is limited in its distribution to the boreal regions of Alaska, Scandinavia, and the C.I.S. (formerly the U.S.S.R.); it does not occur in Illinois.

Branchiobdellida. Branchiobdellidans are obligate symbionts of primarily Holarctic freshwater crustaceans. In 1965, the family Branchiobdellidae was elevated to ordinal rank (Holt, 1965). The subsequent description of numerous genera and species and recognition of the structural diversity expressed by those descriptions prompted Holt to segregate the genera into five families in the order Branchiobdellida (Holt, 1986), three of which occur in North America. The greatest diversity of branchiobdellidans occurs in the upland regions of the southern Appalachians, the Ozarks, and the Atlantic drainage. Some of these species are endemic to very small areas, often a single watershed. Of the 15 genera and 101 species of branchiobdellidans known to occur in North America, three families, six genera, and nine species occur in Illinois.

Oligochaeta. The class Oligochaeta represents the most diverse and widely distributed group of annelids in terrestrial and freshwater habitats in North America. To date, 175

species of freshwater oligochaetes representing six families and 64 genera are known to occur in North America (Coates and Wetzel, unpublished); of these, five families, 42 genera, and 82 species occur in Illinois. In addition, three primarily terrestrial species (families Lumbricidae and Sparganophilidae) frequently collected from freshwater habitats in Illinois have been included in this checklist.

Hirudinea. The Hirudinea, or leeches, are highly specialized annelids, separated from other annelid groups by the presence of a circum-oral sucker, a posterior ventral sucker, and 34 segments. Although leeches primarily are restricted to fresh water, several species occur in estuarine and marine environments. Of the 5 families, 25 genera, and 64 freshwater species known to occur in North America, 4 families, 19 genera and 32 species occur in Illinois.

CHECKLIST OF FRESHWATER ANNELIDA IN ILLINOIS

Species reported here as new records for the state of Illinois are preceded by an asterisk (*). Illinois species collected only from inshore Lake Michigan habitats are preceded by a dagger (†).

PHYLUM ANNELIDA

SUBPHYLUM ACLITELLATA
CLASS APHANONEURA
Order Aeolosomatida
FAMILY AEOLOSOMATIDAE
Genus *Aeolosoma* Ehrenberg, 1828
Aeolosoma hemprichi Ehrenberg, 1828
Aeolosoma tenebrarum Vejdovsky, 1880
Aeolosoma variegatum Vejdovsky, 1884

SUBPHYLUM CLITELLATA
CLASS BRANCHIOBDELLIDA
Order Branchiobdellida
FAMILY BRANCHIOBDELLIDAE
Genus *Xironodrilus* Ellis, 1918
Xironodrilus formosus Ellis, 1919
FAMILY BDELLODRILIDAE
Genus *Bdellodrilus* Moore, 1895
Bdellodrilus illuminatus (Moore, 1893)
FAMILY CAMBARINCOLIDAE
Genus *Cambarincola* Ellis, 1912
Cambarincola chirocephalus Ellis, 1919
Cambarincola macrodontus Ellis, 1912
Cambarincola philadelphicus (Leidy, 1851)
Cambarincola vitreus Ellis, 1919
Genus *Oedipodrilus* Holt, 1967
Oedipodrilus macbaini (Holt, 1955)
Genus *Pterodrilus* Moore, 1895
Pterodrilus distichus Moore, 1894
Genus *Sathodrilus* Holt, 1968
Sathodrilus elevatus (Goodnight, 1940)

CLASS OLIGOCHAETA

Order Lumbriculida

FAMILY LUMBRICULIDAE

Genus *Eclipidrilus* Eisen, 1881

Eclipidrilus asymmetricus (Smith, 1896)

Genus *Lumbriculus* Grube, 1844

Lumbriculus variegatus (Müller, 1774)

Genus *Stylodrilus* Claparède, 1862

†*Stylodrilus heringianus* Claparède 1862

Genus *Trichodrilus* Claparède, 1862

Trichodrilus allobrogum Claparède, 1862

Order Haplotaxida

Suborder Haplotaxina

FAMILY HAPLOTAXIDAE

Genus *Haplotaxis* Hoffmeister, 1843

Haplotaxis ? gordioides (Hartmann, 1821)

(?= *Haplotaxis emissarius* [Forbes, 1890];

?= *Haplotaxis forbesi* Smith, 1918)

Suborder Tubificina

Superfamily Tubificoidea

FAMILY NAIDIDAE

Genus *Allonais* Sperber, 1948

Allonais pectinata (Stephenson, 1910)

Genus *Amphichaeta* Tauber, 1879

**Amphichaeta leydigi* Tauber, 1879

Genus *Bratislavia* Kosel, 1976

Bratislavia unidentata (Harman, 1973)

Genus *Chaetogaster* von Baer, 1827

Chaetogaster diaphanus (Gruithuisen, 1828)

Chaetogaster diastrophus (Gruithuisen, 1828)

Chaetogaster limnaei von Baer, 1827

Genus *Dero* Oken, 1915

Dero (*Aulophorus*) *furcata* (Müller, 1773)

Dero (*Aulophorus*) *vaga* (Leidy, 1880)

Dero (*Dero*) *digitata* (Müller, 1773)

Dero (*Dero*) *nivea* Aiyer, 1930

Dero (*Dero*) *obtusa* d'Udekem, 1835

**Dero* (*Dero*) *pectinata* Aiyer, 1930

**Dero* (*Dero*) *trifida* Loden, 1979

Genus *Haemonais* Bretscher, 1900

**Haemonais waldvogeli* Bretscher, 1896

Genus *Nais* Müller, 1773

Nais barbata Müller, 1773

Nais behningi Michaelsen, 1923

Nais communis Piguet, 1906

Nais elinguis Müller, 1773

Nais pardalis Piguet, 1906

Nais pseudobtusa Piguet, 1906

Nais simplex Piguet, 1906

Nais variabilis Piguet, 1906

Genus *Ophidonais* Gervais, 1838
Ophidonais serpentina (Müller, 1773)
Genus *Paranais* Czerniavsky, 1880
Paranais frici Hrabe, 1941
Genus *Piguetiella* Sperber, 1939
†*Piguetiella michiganensis* Hiltunen, 1967
Genus *Pristina* Ehrenberg, 1828
**Pristina aequiseta* Bourne, 1891
(= *Pristina evelinae* Marcus, 1943;
= *Pristina foreli* Piguet, 1906)
Pristina breviseta Bourne, 1891
Pristina leidyi Smith, 1896
Pristina plumaseta Turner, 1935
Pristina synclites Stephenson, 1925
Genus *Pristinella* Brinkhurst, 1985
Pristinella acuminata (Liang, 1958)
**Pristinella jenkinae* (Stephenson, 1931)
(= *Pristina idrensis* Sperber, 1948)
Pristinella osborni (Walton, 1906)
**Pristinella sima* (Marcus, 1944)
Genus *Slavina* Vejdovsky, 1883
Slavina appendiculata (d'Udekem, 1855)
Genus *Specaria* Sperber, 1939
Specaria josinae (Vejdovsky, 1883)
Genus *Stephensoniana* Cernosvitov, 1938
Stephensoniana trivandrana (Aiyer, 1926)
Genus *Stylaria* Lamarck, 1816
Stylaria lacustris (Linnaeus, 1767)
(= *Stylaria fossularis* Leidy,1852)
Genus *Uncinais* Levinson, 1884
†*Uncinais uncinata* (Ørsted, 1842)
Genus *Vejdovskyella* Michaelsen, 1903
Vejdovskyella intermedia (Bretscher, 1896)

FAMILY TUBIFICIDAE

Genus *Aulodrilus* Bretscher, 1899
Aulodrilus americanus Brinkhurst & Cook, 1966
Aulodrilus limnobius Bretscher, 1899
Aulodrilus pigueti Kowalewski, 1914
Aulodrilus pluriseta (Piguet, 1906)
Genus *Bothrioneurum* Stolc, 1888
Bothrioneurum vejdovskyanum Stolc, 1888
Genus *Branchiura* Beddard, 1892
Branchiura sowerbyi Beddard, 1892
Genus *Ilyodrilus* Eisen, 1879
Ilyodrilus templetoni (Southern, 1909)
Genus *Isochaetides* Hrabe, 1966; emmend. Brinkhurst, 1981
†*Isochaetides curvisetosus* (Brinkhurst & Cook, 1966)
(?= *Isochaetides hamatus* [Moore, 1905])
†*Isochaetides freyi* (Brinkhurst, 1965)

Genus *Limnodrilus* Claparède, 1862
Limnodrilus cervix Brinkhurst, 1963
Limnodrilus claparedianus Ratzel, 1868
Limnodrilus hoffmeisteri Claparède, 1862
Limnodrilus maumeensis Brinkhurst & Cook, 1966
Limnodrilus profundicola (Verrill, 1871)
Limnodrilus rubripenis Loden, 1977
Limnodrilus tortilipenis Wetzel, 1987
Limnodrilus udekemianus Claparède, 1862
Genus *Potamothrix* Vejdovsky & Mrázek, 1902
Potamothrix bavaricus (Öschmann, 1913)
†*Potamothrix bedoti* (Piguet, 1913)
Potamothrix moldaviensis Vejdovsky & Mrázek, 1902
Potamothrix vejdovskyi (Hrabe, 1941)
Genus *Psammoryctides* Hrabe, 1964
Psammoryctides californianus Brinkhurst, 1965
Genus *Quistadrilus* Brinkhurst, 1981
Quistadrilus multisetosus (Smith, 1900)
Genus *Rhizodrilus* Smith, 1900
Rhizodrilus lacteus Smith, 1900
Genus *Rhyacodrilus* Bretscher, 1901
Rhyacodrilus coccineus (Vejdovsky, 1875)
**Rhyacodrilus falciformis* Bretscher, 1901
Rhyacodrilus montanus (Brinkhurst, 1965)
Genus *Spirosperma* Eisen, 1879
Spirosperma ferox Eisen, 1879
†*Spirosperma nikolskyi* (Lastockin & Sokolskaya, 1935)
(= *Spirosperma variegatus* Leidy, 1851 sensu Brinkhurst, 1962)
Genus *Tasserkidrilus* Holmquist, 1985
Tasserkidrilus kessleri (Hrabe, 1962)
†*Tasserkidrilus superiorensis* (Brinkhurst & Cook, 1966)
Genus *Tubifex* Lamarck, 1816
†*Tubifex ignotus* (Stolc, 1886)
Tubifex tubifex (Müller, 1774)
Genus *Varichaetadrilus* Brinkhurst & Kathman, 1983
Varichaetadrilus angustipenis (Brinkhurst & Cook, 1966)

Superfamily Enchytraeoidea

FAMILY ENCHYTRAEIDAE
Genus *Barbidrilus* Loden & Locy, 1980
Barbidrilus paucisetus Loden & Locy, 1980
Genus *Lumbricillus* Ørsted, 1844
Lumbricillus rivalis (Levinsen, 1883)
augmented Ditlevsen, 1904
Genus *Marionina* Pfeffer, 1890
Marionina forbesae Smith & Welch, 1913 ?incertae sedis
Genus *Henlea* Michaelsen, 1899
Henlea urbanensis Welch, 1914

Suborder Lumbricina
Superfamily Lumbricoidea
FAMILY LUMBRICIDAE
Genus *Eisenia* Malm, 1877
Eisenia foetida Savigny, 1826
Genus *Eiseniella* Michaelsen, 1900
Eiseniella tetraedra (Savigny, 1826)
FAMILY SPARGANOPHILIDAE
Genus *Sparganophilus* Benham, 1892
Sparganophilus eiseni Smith, 1895

CLASS HIRUDINEA
Order Rhynchobdellida
FAMILY GLOSSIPHONIIDAE
Genus *Actinobdella* Moore, 1901
Actinobdella inequiannulata Moore, 1901
Genus *Alboglossiphonia* Luken, 1976
Alboglossiphonia heteroclita (Linnaeus, 1761)
Genus *Desserobdella* Barta & Sawyer, 1990
Desserobdella phalera (Graf, 1899)
Desserobdella picta (Verrill, 1872)
Genus *Gloiobdella* Ringuelet, 1978
Gloiobdella elongata (Castle, 1900)
Genus *Glossiphonia* Johnson, 1816
Glossiphonia complanata (Linnaeus, 1758)
Genus *Helobdella* R. Blanchard, 1896
Helobdella fusca (Castle, 1900)
Helobdella papillata (Moore, 1906)
Helobdella stagnalis (Linnaeus, 1758)
Helobdella triserialis (E. Blanchard, 1849)
Genus *Placobdella* R. Blanchard, 1893
Placobdella montifera Moore, 1906
Placobdella multilineata Moore, 1953
Placobdella ornata (Verrill, 1872)
Placobdella papillifera (Verrill, 1872)
Placobdella parasitica (Say, 1824)
Placobdella pediculata Hemingway, 1908
Genus *Theromyzon* Phillippi, 1867
Theromyzon biannulatum Klemm, 1977
FAMILY PISCICOLIDAE
Genus *Cystobranchus* Diesing, 1859
Cystobranchus verrilli Meyer, 1940
Genus *Myzobdella* Leidy, 1851
Myzobdella lugubris Leidy, 1851
Genus *Piscicola* de Blainville, 1818
Piscicola milneri (Verrill, 1874)
Piscicola punctata (Verrill, 1871)
Genus *Piscicolaria* Whitman, 1889
Piscicolaria reducta Meyer, 1940

Order Gnathobdellida
FAMILY HIRUDINIDAE
Genus *Haemopis* Savigny, 1822
Haemopis marmorata (Say, 1824)
Haemopis terrestris (Forbes, 1890)
Genus *Macrobdella* Verrill, 1872
Macrobdella decora (Say, 1824)
Genus *Philobdella* Verrill, 1874
Philobdella gracilis Moore, 1901
Order Pharyngobdellida
FAMILY ERPOBDELLIDAE
Genus *Dina* R. Blanchard, 1892
Dina dubia Moore & Meyer, 1951
Dina parva Moore, 1912
Genus *Erpobdella* de Blainville, 1818
Erpobdella punctata punctata (Leidy, 1870)
Genus *Mooreobdella* Pawlowski, 1955
Mooreobdella fervida Verrill, 1871
Mooreobdella microstoma (Moore, 1901)
Genus *Nephelopsis* Verrill, 1872
Nephelopsis obscura Verrill, 1872

DISCUSSION

This paper presents the first published documentation of eight species of aquatic oligochaetes occurring in Illinois; seven of these are considered widespread and have been collected from aquatic habitats in several other states. Because prior distributional and ecological information for one species, *Rhyacodrilus falciformis,* is extremely limited, an account for this tubificid is provided here.

During a survey for fishes, unionid mussels, and other aquatic macroinvertebrates from several streams within a proposed Illinois Department of Transportation FAP 431 / 340 highway corridor, three mature specimens of *Rhyacodrilus falciformis* were collected from Fraction Run by M. J. Wetzel and B. J. Kasprowicz on 6 June 1988. Previous collections of annelids from this site, conducted on 14 May and 17 September 1987, yielded no *R. falciformis*.

Location. The Fraction Run sampling site is 2.8 mi (4.5 km) SE Lockport, in Will County, Illinois [3rd Principal Meridian: Township 36 North, Range 11 East, SE/4, NE/4, SE/4, Section 30; Universal Transverse Mercator System: Zone 16, $^{4}16^{080m}$ East, $^{46}02^{710m}$ North; elevation: 700' MSL; all information taken from the Joliet, Illinois (7.5' series, 1962 edition, photorevised in 1973) USGS topographic quadrangle map].

Habitat characterization. The Fraction Run site is at the front of the West Chicago Moraine of the Valparaiso Morainic System, which consists of a series of superposed ridgelike features that mark former ice-margin positions. Gray silty clay till of the Wadsworth Till Member is mapped as the surficial unit in these moraines; lenses and beds of stratified sediment (silt, sand, and fine gravel) are common within the Wadsworth

and are sometimes encountered along the moraine fronts, which likely represent slight readvances of the glacier. Small springs and seeps commonly issue from such zones of stratified sediment, especially along colluviated slopes where valleyside wetlands have been described (Hansel and Johnson, 1991).

The area surveyed for aquatic biota at this Fraction Run locality extended from approximately 30 meters downstream to approximately 45 meters upstream of a county road bridge. A small tributary, North Fraction Run, joins Fraction Run approximately 30 meters upstream of the bridge; a stretch of this tributary extending approximately 15 meters above its confluence with Fraction Run also was surveyed. According to the Horton-Strahler classification (Horton, 1945; Strahler, 1954, 1957), Fraction Run at this locality is designated as an order 2 stream. From this site, Fraction Run flows in a westerly direction for approximately 6 kilometers to its confluence with the Illinois and Michigan Canal (Des Plaines River drainage) just south of Lockport.

Downstream from the bridge, Fraction Run has been channelized, and its width ranges from 2 to 3 meters with an average depth of 20 centimeters. During our recent survey, a pool 4 to 8 meters wide and 1 meter deep occurred immediately upstream of the bridge; upstream of this pool, Fraction Run and North Fraction Run consisted of a series of small pools (0.3 to 1.6 meters wide and 4 to 45 centimeters deep) alternating with small riffle and run areas (30 to 60 centimeters wide and 2 to 7 centimeters deep).

Substrate downstream of the bridge was characterized as 40% clay, 30% sand, and 30% gravel; upstream of the bridge, the substrate of the pool consisted of a 50% silt/detritus mixture and 50% sand. The substrate of North Fraction Run and Fraction Run above their confluence consisted of clay and gravel. The turbidity of the water throughout the sampling area was low.

Field water quality parameters measured during this collection included ambient temperature (32.5°C), water temperature (23.5°C), dissolved oxygen (11.0 mg/l), hydrogen ion concentration (as pH) (8.2), specific conductivity (795 µmhos), and alkalinity (218 mg/l as $CaCO_3$).

Species Account - *Rhyacodrilus falciformis* Bretscher, 1901

Rhyacodrilus falciformis, the type species in this genus, was first described from material collected in 1900 from the Swiss Alps (Bretscher, 1901). This species subsequently was redescribed by Juget (1967) (from specimens collected from the profundal area of Lac Léman, France) and Kasprzak (1979) (from specimens collected from four sites in the Pieniny Mountains of southern Poland). Its length is 8 to 10 mm, with an average of 48 segments per specimen. The anterior dorsal chaetal bundles contain three to four bifid chaetae. The anterior ventral chaetal bundles contain three to five bifid chaetae, with the upper tooth being thinner and longer than the lower; the lower tooth sometimes is divided. The penial chaetae in segment XI are twice as long and up to six times as thick as the other chaetae, are sickle-shaped, and number one to two per bundle. The atria are elongate and pear-shaped with diffuse prostate glands. The vasa deferentia enter the atria subapically, an unusual characteristic in the Tubificidae. The spermathecae may or may not have diverticulae connecting the spermathecal ampullae to the intestine.

The first North American record of *Rhyacodrilus falciformis* was reported by Brinkhurst (1978), who recorded four specimens from Airport Creek, a small tributary of the Saanich Inlet in the northern end of the Saanich Peninsula on Vancouver Island, British Columbia. It subsequently was reported from the Hudson River in New York (Stimpson et al., 1982) and from Cascade Cave on Vancouver Island (21 specimens, July 1984) (R. O. Brinkhurst, pers. comm.). The collection of *Rhyacodrilus falciformis* from Fraction Run in Will County, Illinois, represents only the fourth known North American locality for this species. Specimens of *Rhyacodrilus falciformis* collected during the survey of Fraction Run are deposited in the permanent INHS Annelid Collection in Champaign, Illinois.

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LITERATURE CITED

Alexander, C. P. 1925. An entomological survey of the Salt Fork of the Vermilion River in 1921, with a bibliography of aquatic insects. Bull. Illinois St. Nat. Hist. Surv. 15(8): 439-535.

Barta J. R., and R. T. Sawyer. 1990. Definition of a new genus of glossiphoniid leech and a redescription of the type species, *Clepsine picta* Verrill, 1872. Can. J. Zool. 68(9): 1942-1950.

Brace, E. M. 1901. Notes on *Aeolosoma tenebrarum*. J. Morph. 17(2): 177-183 + 1 plate.

Bretscher, K. 1901. Beobachtungen über Oligochaeten der Schweiz. Rev. Suisse Zool., Genève 9(2): 189-223.

Brinkhurst, R. O. 1964. Studies on the North American aquatic Oligochaeta. I: Naididae and Opistocystidae. Proc. Acad. Nat. Sci. Philadelphia 116(5): 195-230.

Brinkhurst, R. O. 1965. Studies on the North American aquatic Oligochaeta. II: Tubificidae. Proc. Acad. Nat. Sci. Philadelphia 117(4): 117-172.

Brinkhurst, R. O. 1966a. A taxonomic revision of the family Haplotaxidae. J. Zool., London 150: 29-51.

Brinkhurst, R. O. 1966b. Taxonomical studies on the Tubificidae (Annelida, Oligochaeta). Supplement. Internat. Revue ges. Hydrobiol. 51(5): 727-742.

Brinkhurst, R. O. 1978. Freshwater Oligochaeta in Canada. Can. J. Zool. 56(10): 2166-2175.

Brinkhurst, R. O. 1982. Evolution in the Annelida. Can. J. Zool. 60(5): 1043-1059.

Brinkhurst, R. O. 1986. Guide to the freshwater aquatic microdrile oligochaetes of North America. Can. Spec. Publ. Fish. Aquat. Sci. 84. vi + 259 pp.

Brinkhurst, R. O. 1988. A taxonomic analysis of the Haplotaxidae. Can. J. Zool. 66(10): 2243-2252.

Brinkhurst, R. O. 1989. A phylogenetic analysis of the Lumbriculidae (Annelida, Oligochaeta). Can. J. Zool. 67(11): 2731-2739.

Brinkhurst, R. O., and D. G. Cook. 1966. Studies on the North American Aquatic Oligochaeta. III: Lumbriculidae and additional notes and records of other families. Proc. Acad. Nat. Sci. Philadelphia 118(1): 1-33.

Brinkhurst, R. O., and S. R. Gelder. 1989. Did the lumbriculids provide the ancestors of the branchiobdellidans, acanthobdellidans and leeches? Hydrobiologia 180: 7-15.

Brinkhurst, R. O., and S. R. Gelder. 1991. Annelida: Oligochaeta and Branchiobdellida. Pp. 401-435, in J. H. Thorp and A. P. Covich, eds. Ecology and classification of North American freshwater invertebrates. Available from Academic Press, Inc., Book Marketing Dept. #10520, 1250 Sixth Avenue, San Diego, California, 92101-9665.

Brinkhurst, R. O., and B. G. M. Jamieson. 1971. Aquatic Oligochaeta of the world. Univ. Toronto Press, Buffalo, New York. 860 pp.

Brinkhurst, R. O., and A. F. L. Nemec. 1987. A comparison of phenetic and phylogenetic methods applied to the systematics of Oligochaeta. Hydrobiologia 155: 65-74.

Brinkhurst, R. O., and M. J. Wetzel. 1984. Aquatic Oligochaeta of the world: Supplement. Can. Tech. Rept. Hydrogr. Ocean Sci. No. 44. v + 101 pp.

Coates, K. A. 1987. Phylogenetics of some Enchytraeidae (Annelida: Oligochaeta): A preliminary investigation of relationships to the Haplotaxidae. Hydrobiologia 155: 91-106.

Davies, R. W. 1991. Annelida: Leeches, polychaetes, and acanthobdellids. Pp. 437-479, in J. H. Thorp and A. P. Covich, eds. Ecology and classification of North American freshwater invertebrates. Available from Academic Press, Inc., Book Marketing Dept. #10520, 1250 Sixth Avenue, San Diego, California, 92101-9665.

Ellis, M. M. 1919. The branchiobdellid worms in the collection of the United States National Museum, with descriptions of new genera and species. Proc. U. S. Nat. Mus. 55(2267): 241-265 + 4 plates.

Erséus, C. 1987. Phylogenetic analysis of the aquatic Oligochaeta under the principle of parsimony. Hydrobiologia 155: 75-89.

Evans, C. R. 1939. The Branchiobdellidae (Annelida) on crayfishes of Champaign County, Illinois. J. Parasitol. 25(5): 448.

Forbes, S. A. 1890. An American terrestrial leech. Bull. Illinois St. Lab. Nat. Hist. 3(8): 119-122.

Forbes, S. A., and R. E. Richardson. 1913. Studies on the biology of the upper Illinois River. Bull. Illinois St. Lab. Nat. Hist. 9(10): 481-574.

Galloway, T. W. 1911. The common fresh-water Oligocheta [sic] of the United States. Trans. Amer. Microsc. Soc. 30(4): 285-317.

Garman, H. 1890. A preliminary report on the animals of the Mississippi Bottoms near Quincy, Illinois, in August, 1888. Part I. Bull. Illinois St. Lab. Nat. Hist. 3(9): 123-184.

Gelder, S. R., and R. O. Brinkhurst. 1990. An assessment of the phylogeny of the Branchiobdellida (Annelida: Clitellata), using PAUP. Can. J. Zool. 68(6): 1318-1326.

Gersbacher, W. M. 1937. Development of stream bottom communities in Illinois. Ecology 18(3): 359-390.

Goodnight, C. J. 1940. The Branchiobdellida (Oligochaeta) of North American crayfishes. Illinois Biol. Monogr. No. 17(3): 1-75.

Hansel, A. K., and W. H. Johnson. 1991. Late Quaternary record of the Chicago Outlet Area. Pages 61-72, in A. K. Hansel and W. H. Johnson, eds. Quaternary records of Northeastern Illinois and Northeastern Indiana. Illinois State Geological Survey Guidebook 22. Illinois State Geological Survey, Champaign.

Holt, P. C. 1965. The systematic position of the Branchiobdellida (Annelida: Clitellata). Syst. Zool. 14(1): 25-32.

Holt, P. C. 1986. Newly established families of the order Branchiobdellida (Annelida: Clitellata) with a synopsis of the genera. Proc. Biol. Soc. Washington 99(4): 676-702.

Holt, P. C. 1989. Comments on the classification of the Clitellata. Hydrobiologia 180: 1-5.

Horton, R. E. 1945. Erosional development of streams and their drainage basins: hydrophysical approach to quantitative morphology. Bull. Geol. Soc. Amer. 56: 275-370.

Howmiller, R., and M. S. Loden. 1976. Identification of Wisconsin Tubificidae and Naididae. Trans. Wisconsin Acad. Sci. Arts Lett. 64: 185-197.

Jamieson, B. G. M. 1978. Phylogenetic and phenetic systematics of the opisthoporous Oligochaeta (Annelida: Clitellata). Evol. Theor. 3(4): 195-233.

Jamieson, B. G. M. 1980. Preliminary discussion of an Hennigian analysis of the phylogeny and systematics of opisthoporous oligochaetes. Rev. Ecol. Biol. Sol 17(2): 261-275.

Jones, S. R. M., and P. T. K. Woo. 1990. Redescription of the leech *Desserobdella phalera* (Graf, 1899) n.comb. (Rhynchobdellida: Glossiphoniidae), with notes on its biology and occurrence on fishes. Can. J. Zool. 68(9): 1951-1955.

Juget, J. 1967. Quelques données nouvelles sur les Oligochétes du Léman: composition et origine du peuplement. Ann. Limnol. 3(2): 217-229.

Kasprzak, K. 1979. [Oligochaetes (Oligochaeta) of the Pieniny Mountains. II. Naididae, Tubificidae, Haplotaxidae, Lumbriculidae, Branchiobdellidae.] [in Polish with English summary]. Fragm. Faun. 24(2): 57-80.

Kasprzak, K. 1982. Problems of the origin of oligochaetes (Annelida: Oligochaeta). Prezgl. Zool. 26: 145-160. (English translation, Can. Transl. Fish. Aquat. Sci. No. 4996).

Kasprzak, K. 1984. The previous and contemporary conceptions on phylogeny and systematic classifications of Oligochaeta (Annelida). Ann. Zool. (Polska Akad. Nauk Inst. Zool.) 38: 205-223.

Kelly, H. M. 1899. A statistical study of the parasites of the Unionidae. Bull. Illinois St. Lab. Nat. Hist. 5(8): 399-418.

Kindred, J. E. 1918. A representative of the genus *Trichodrilus* from Illinois. Bull. Illinois St. Nat. Hist. Surv. 13(4): 49-52.

Klemm, D. J. 1972a. Freshwater leeches (Annelida: Hirudinea) of North America. Identification Manual No. 8, Biota of freshwater ecosystems. Water Pollution Control Research Series 18050 ELD05/72. U.S. Environmental Protection Agency, Washington, DC. viii + 53 pp.

Klemm, D. J. 1972b. The leeches (Annelida: Hirudinea) of Michigan. Michigan Acad. 4(4): 405-444.

Klemm, D. J. 1982. Leeches (Annelida: Hirudinea) of North America. U. S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, OH. EPA-600/3-82-025. xvii + 177 pp.

Klemm, D. J., ed. 1985. A guide to the freshwater Annelida (Polychaeta, naidid and tubificid Oligochaeta, and Hirudinea) of North America. Kendall/Hunt Publishing Company, Dubuque, IA. xiii + 198 pp.

Klemm, D. J., D. G. Huggins, and M. J. Wetzel. 1979. Kansas leeches (Annelida: Hirudinea) with notes on distribution and ecology. Tech. Publ. St. Biol. Surv. Kansas 8: 38-46.

Mathis, B. J., and T. F. Cummings. 1971. Distribution of selected metals in bottom sediments, water, clams, tubificid annelids, and fishes of the middle Illinois River. Water Research Report No. 41. University of Illinois Water Resources Center, 2535 Hydrosystems Laboratory, Urbana. UILU-WRC-71--0041. 45 pp.

Moore, J. P. 1901. The Hirudinea of Illinois. Bull. Illinois St. Lab. Nat. Hist. 5(12): 479-547.

Nilsen, H. C., and R. W. Larimore. 1973. Establishment of invertebrate communities on log substrates in the Kaskaskia River, Illinois. Ecology 54(2): 366-374.

Paloumpis, A. A., and W. C. Starrett. 1960. An ecological study of benthic organisms in three Illinois River flood plain lakes. Amer. Midl. Nat. 64(2): 406-435.

Parker, S. P. 1982. Synopsis and classification of living organisms. McGraw Hill, New York. 1,232 pp.

Reynolds, J. W., and D. G. Cook. 1976. Nomenclatura oligochaetologica. A catalogue of names, descriptions and type specimens of the Oligochaeta. Univ. New Brunswick, Fredericton, New Brunswick. x + 217 pp.

Reynolds, J. W., and D. G. Cook. 1981. Nomenclatura oligochaetologica. Supplementum primum. A catalogue of names, descriptions and type specimens of the Oligochaeta. [Publ. by Univ. New Brunswick] Fredericton, New Brunswick. v + 39 pp.

Reynolds, J. W., and D. G. Cook. 1989. Nomenclatura oligochaetologica. Supplementum secundum. A catalogue of names, descriptions and type specimens of the Oligochaeta. New Brunswick Mus. Monog. Ser. (Nat. Sci.) No. 8. v + 37 pp.

Richardson, R. E. 1921a. The small bottom and shore fauna of the middle and lower Illinois River and its connecting lakes, Chillicothe to Grafton: its valuation; its sources of food supply; and its relation to the fishery. Bull. Illinois St. Nat. Hist. Surv. 13(15): 363-522.

Richardson, R. E. 1921b. Changes in the bottom and shore fauna of the middle Illinois River and its connecting lakes since 1913-1915 as a result of the increase, southward, of sewage pollution. Bull. Illinois St. Nat. Hist. Surv. 14(4): 33-75.

Richardson, R. E. 1925a. Changes in the small bottom fauna of Peoria Lake, 1920-1922. Bull. Illinois St. Nat. Hist. Surv. 15(5): 327-388 + 3 tables.

Richardson, R. E. 1925b. Illinois River bottom fauna in 1923. Bull. Illinois St. Nat. Hist. Surv. 15(6): 391-422.

Richardson, R. E. 1928. The bottom fauna of the middle Illinois River, 1913-1915. Its distribution, abundance, valuation, and index value in the study of stream pollution. Bull. Illinois St. Nat. Hist. Surv. 17(12): 387-475.

Sawyer, R. T. 1986a. Leech biology and behaviour. Volume I. Anatomy, physiology, and behaviour. Clarendon Press, Oxford. xiv + pp. 1-417 + index.

Sawyer, R. T. 1986b. Leech biology and behaviour. Volume II. Feeding biology, ecology, and systematics. Clarendon Press, Oxford. xiv + pp. 419-793 + index.

Sawyer, R. T. 1986c. Leech biology and behaviour. Volume III. Bibliography. Clarendon Press, Oxford. x + pp. 799-1,065.

Seagle, H. H., Jr., and M. J. Wetzel. 1982. Range extension of *Barbidrilus paucisetus* Loden and Locy (Oligochaeta: Enchytraeidae). Freshw. Invert. Biol. 1(4): 52-53.

Singer, R. G. 1977. The biology of *Aeolosoma* (Annelida). Unpubl. Ph.D. thesis, Univ. Illinois, Urbana. 166 pp.

Singer, R. G. 1978. Suction-feeding in *Aeolosoma* (Annelida). Trans. Amer. Microsc. Soc. 97(1): 105-111.

Smith, F. 1895a. Notes on species of North American Oligochaeta. Bull. Illinois St. Lab. Nat. Hist. 4(8): 285-297.

Smith, F. 1895b. A preliminary account of two new Oligochaeta from Illinois. Bull. Illinois St. Lab. Nat. Hist. 4(5): 138-148.

Smith, F. 1896. Notes on species of North American Oligochaeta. II. Bull. Illinois St. Lab. Nat. Hist. 4(14): 396-413 + 4 plates.

Smith, F. 1900a. Notes on species of North American Oligochaeta. III. List of species found in Illinois, and descriptions of Illinois Tubificidae. Bull. Illinois St. Lab. Nat. Hist. 5(10): 441-458 + 2 plates.

Smith, F. 1900b. Notes on species of North American Oligochaeta. IV. On a new lumbriculid from Florida, with additional notes on the nephridial and circulatory systems of *Mesoporodrilus asymmetricus*. Bull. Illinois St. Lab. Nat. Hist. 5(11): 459-478.

Smith, F. 1918. A new North American oligochaete of the genus *Haplotaxis*. Bull. Illinois St. Nat. Hist. 13(3): 43-48.

Smith, F., and P. S. Welch. 1913. Some new Illinois Enchytraeidae. Bull. Illinois St. Lab. Nat. Hist. 9(12): 615-636 + 5 plates.

Spencer, D. R. 1980. The aquatic Oligochaeta of the St. Lawrence Great Lakes region. Pp. 115-164, in R. O. Brinkhurst and D. G. Cook, eds. Aquatic oligochaete biology. Plenum Press, New York.

Stimpson, K. S., J. R. Brice, M. T. Barbour, and P. Howe. 1975 Distribution of inshore oligochaetes in Lake Michigan. Trans. Amer. Microsc. Soc. 94(3): 384-394.

Stimpson, K. S., D. J. Klemm, and J. K. Hiltunen. 1982. A guide to the freshwater Tubificidae (Annelida: Clitellata: Oligochaeta) of North America. Environmental Monitoring and Support Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, OH. EPA-600/3-82-033. x + 61 pp.

Strahler, A. N. 1954. Quantitative geomorphology of erosional landscapes. 19th Internat. Geol. Congr. Sec. 13: 341-354.

Strahler, A. N. 1957. Quantitative analysis of watershed geomorphology. Trans. Amer. Geophys. Union 38: 913-920.

Thompson, D. H. 1927. An epidemic of leeches on fishes in Rock River. Bull. Illinois St. Nat. Hist. Surv. 17(3): 195-201.

Timm, T. 1981. On the origin and evolution of aquatic Oligochaeta. Eesti NSV Tead. Akad. Toim. 30. Koide Biologia 3: 174-181.

Welch, P. S. 1914. Studies on the Enchytraeidae of North America. Bull. Illinois St. Lab. Nat. Hist. 10(3): 123-212 + 5 plates.

Wetzel, M. J. 1981. *Limnodrilus rubripenis* Loden and *Psammoryctides californianus* Brinkhurst, two aquatic worms (Annelida: Oligochaeta: Tubificidae) new to Illinois. Trans. Illinois St. Acad. Sci. 73(3): 36-38.

Wetzel, M. J. 1982a. Kansas leeches (Annelida: Hirudinea) with notes on distribution and ecology. II. Tech. Publ. St. Biol. Surv. Kansas 12: 105-111.

Wetzel, M. J. 1982b. Aquatic Oligochaeta (Annelida: Clitellata) in Kansas, with notes on their distribution and ecology. Tech. Publ. St. Biol. Surv. Kansas 12: 112-130.

Wetzel, M. J. 1982c. The distribution and relative abundance of aquatic Oligochaeta in the upper Cache River basin, southern Illinois, in relation to water quality. Unpubl. M. S. thesis, Eastern Illinois Univ., Charleston. x + 182 pp.

Wetzel, M. J. 1987. *Limnodrilus tortilipenis*, a new North American species of freshwater Tubificidae (Annelida: Clitellata: Oligochaeta). Proc. Biol. Soc. Washington 100(1): 182-185.