Gerridae (water striders) of Idaho (Heteroptera)

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GERRIDAE (WATER STRIDERS) OF IDAHO (HETEROPTERA)

R. C. Biggam and M. A. Brusven

ABSTRACT.—A biosystematic study on the Gerridae of Idaho was undertaken to clarify and describe the taxonomy, species distribution, and biology of this aquatic hemipteran family. Three genera and 7 species were collected in the state. Keys to three genera and 10 species are provided. General descriptions, diagnoses, and distributional ranges are given for species occurring within and adjacent to Idaho.

Special interest in aquatic and subaquatic Heteroptera by the authors and recently published papers on the Gerridae of Montana (Roehmild 1976) and Oregon and Washington (Stonedahl and Lattin 1982) prompted this taxonomic study on the Gerridae of Idaho. The ubiquitous nature, conspicuous habits, predaceous activities, and nutritive value of gerrids to higher trophic levels make them an important group in aquatic and semiaquatic ecosystems.

The purposes of this study were to determine the distributions of species occurring in Idaho, clarify taxonomic differences between related species occurring in or adjacent to the state, provide a diagnostic key for the identification of species, and provide information on habitat affinities. Three genera and seven species of Gerridae are recorded in the state.

CLASSIFICATION AND DISTRIBUTION

Approximately 488 species of Gerridae in 55 genera occur throughout the world (Andersen 1982). Five subfamilies were recognized by Hungerford and Matsuda (1960) and eight by Andersen (1975, 1982); two occur in Idaho and the Pacific Northwest (Gerrinae and Trepobatinae).

The family Gerridae is worldwide in distribution except for the polar regions. Gerrids live on the surfaces of rivers, mountain streams, and warm ponds (Fairbairn 1985a), lakes, reservoirs, irrigation canals, and hot springs (Calabrese and Tallerico 1982), road puddles, ditches, sinkhole ponds, marshes, and swamps (Herring 1950, 1951), saline lakes (Scudder 1969, 1971), brackish coastal waters (Vepsäläinen 1973, Andersen 1975, Cobben 1960), and the open ocean (Andersen and Polhemus 1976). Five species of the genus Halobates have been collected hundreds of miles from the nearest land (Cheng 1974), making them one of the few insects to successfully occupy the open ocean. Vepsäläinen (1973), Calabrese (1977), and Spence and Scudder (1980) found that gerrids display habitat preferences. Strict habitat association is the most important factor in ecological species separation and coexistence (Spence and Scudder 1980, Spence 1983).

BIOLOGY AND LIFE HISTORY

Gerrids are opportunistic predators (Jamie- son and Scudder 1977) on other insects of the neuston community and terrestrial invertebrates that fall into the water. They are also known to feed on fruits and berries (Riley 1918). Live prey are preferred, but scavenging and cannibalism are probably necessary for some to survive. Coastal gerrids may feed on windblown terrestrial insects found on the sea (Andersen and Polhemus 1976). Ongoing Halobates feed on coelenterates (Savilov 1967). Cannibalism occurs in most species and is usually the result of overcrowding, food shortage, or vulnerability during molting (Riley 1922a, 1922b, 1925, Stonedahl and Lattin 1982). Gerrids detect their prey and mates by orientation to surface waves caused by the object of intent (Murphy 1971a, 1971b, 1971c, Weber 1930, Wilcox 1972, 1979, Lawry 1973). The prey is quickly grasped by the raptorial
forelegs, after which the cutting, mandibular stylets of the forward-extended rostrum are inserted into the prey (Cobben 1978). These stylets also serve in the transfer of enzymatic secretions into the prey and the extraction of the prey's body fluids (Cheng 1967a, 1974).

Gerrids have hemimetabolous or gradual development; the immature stage is a nymph. Eggs are attached to submerged vegetation or other substrates either singly or in clusters (Hungerford 1920, Cobben 1968, Andersen and Polhemus 1976). One European species, Gerris najas De Geer, attaches its eggs to lake bottom substrates (Brinkhurst 1960), whereas members of the subfamily Rhagadotsinae insert their eggs directly into plant tissue (Silvey 1931). The eggs, usually white when laid, turn to amber with age and range in size from 1.0 × 0.33 mm to 1.6 × 0.5 mm (Herring 1961). The eggs usually hatch within 14 days (Torre-Bueno 1917a, 1917b, Hungerford 1920, Hoffman 1924, Bobb 1951, Herring 1961, Cheng 1967b). An egg burster is used by the first instar nymph to escape from the chorion (Hungerford 1920, Cobben 1968). The newly hatched nymphs make their way to the surface, break the surface tension, and begin life on the water’s surface. Depending on environmental factors, one to six generations per year have been noted (Torre-Bueno 1917a, Hoffman 1924, Cheng 1967b, Cheng and Fernando 1970, Bobb 1974, Vepsäläinen 1974b, 1974c, Callahan 1974, Polhemus and Chapman 1979, Spence and Scudder 1980). The nymphs have five instars or molts and require 21 to 44 days to achieve adulthood (Penn and Goldsmith 1950, Bobb 1951, Herring 1961).

Spence et al. (1980b) reported that temperature is very important in development. They observed several species basking underwater during low air temperatures, presumably to increase gonad development (1980a). The nymphs are similar in appearance to the adults except in size, body proportion, near absence of external genitalia structures, lack of scent glands, and presence of only one tarsal segment per leg. After ecdisis via a Y-shaped suture on the thorax (Cheng 1967b), the adults remain teneral for several days, thus leaving themselves vulnerable to predation and cannibalism (Andersen 1973).

Wing polymorphism in the adult stage is prevalent in most species (Brinkhurst 1959, 1961, 1963, Vepsäläinen 1971a, 1971b, 1974a, 1974b, Andersen 1973, Järvinen and Vepsäläinen 1976) where apterous to macropterous forms can occur. Apterous populations usually indicate a stable population and habitat. Macropterous populations are common in unstable or confined habitats such as ponds or lakes. In populations with multiple generations, early apterous generations often produce macropterous individuals for population dispersion (Brinkhurst 1963). Macropterous forms usually overwinter as adults and reproduce the following season. Occasionally, brachypterous and micropterous forms of the same species may occur together, the result of population density, climatic changes, and/or habitat instability. Vepsäläinen (1971a, 1971b) observed that an environmental switching mechanism caused by day length, temperature, and illumination rhythm is the probable cause of the varying wing lengths from one generation to the next in bivoltine or trivoltine populations.

Gerrid flight activity has been reported by Riley (1920), Leeceh (1970), Callahan (1974), and Spence and Scudder (1980). Riley (1925) lists food deficiency, drought, and overcrowding as important factors influencing flight. Overcrowding can also result in compensatory upstream dispersal (Fairbairn 1985b). Shortened day lengths during larval development induce diapause (Vepsäläinen 1971b, 1974a, 1974d). Lee et al. (1975) reported that triglycerides were metabolized during hibernation in G. remigis Say.

Gerrids are fed upon by frogs (Drake 1914, Torre-Bueno 1917b, Riley 1925, Callahan 1974), fish and Dytiscus beetles (Riley 1925), ducks (McAtee 1918, Mabbot 1920, Anderson 1932), shorebirds (Wetmore 1925), swallows (Beal 1918), trout (Callahan 1974), and hedgehogs (Obrtel and Holisova 1981). The senior author observed Gryllolbattla campodeiformis Walker (Orthoptera: Gryllolbattidae) feeding on Gerris remigis Say. Cooper (1984), although never observing trout actually feeding on gerrids in the wild, reported fish readily taking experimentally disabled specimens. Some gerrids will attempt to escape predation by feigning death (Essenberg 1915, Riley 1921, Callahan 1974). Gerrids can inflict a painful bite with their beak, and the pain can be long lasting.
Flagellate protozoans (Trypanosomes) (Poisson 1957, Wallace et al. 1960), nematodes (Poisson 1957), and parasitic Hymenoptera (Usinger 1956) in the families Mymaridae (Caraphractus cinctus Walker & Anaphes gerrisophaga [Doutt] Gordh 1979) and Secelionidae (Tiphodytes gerriphagus [Marchal] Muesebeck 1979) are reported as being endoparasites of gerrid eggs. Larvae of certain Hydracarina (water mites) are known ectoparasites of gerrids (Torre-Bueno 1917a, Polhemus and Chapman 1979). Maier (1977) and Schaefer (1978) reported cleptoparasitic interactions between hydrometrids and gerrid prey where the hydrometrid obtained a meal from a gerrid’s prey by simultaneously feeding on it. Life history studies have been reported in the literature for many species. Confusion between similar species has likely led to inaccurate accounts for some (Drake and Harris 1934).

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1Polhemus (1964).
*Not recorded in Idaho, but may occur in state.
A general overview of habitat, trophic relationships, and seasonal occurrence for the Idaho species is given in Table 1. General distribution is discussed for each species.

**GENERAL DESCRIPTION AND DIAGNOSIS**

Members of the family Gerridae, known to many as water striders, pond skaters, or wherrymen, are small- to medium-sized insects (6.65-20.0 mm) with narrow, elongate bodies and long legs. The head is shorter than the pronotum and mesonotum combined. A four-segmented, filiform antenna is inserted on either side of the head behind the large, rounded, compound eyes; ocelli are absent. The rostrum or beak is four-segmented. The thorax is variable according to the degree of wing development. Apterous, brachypterous, and macropterous forms occur in many species. The forelegs are short and raptorial, whereas the middle and hind legs are long and slender and have two tarsal segments present in the adults; the nymphs have one segment. Tarsal claws are preapical. The procoxae are remote from the meso- and metacoxae. A median scent gland opening on the metasternum, the omphalium, is found in most gerrids but is absent in the subfamilies Rhagadotarsinae and many Treptobatinae. A velvety gray to dark brown pile of hydrofuge hairs covers most of the body. Cheng (1973) found two types of hairs in *Haloletes*: (1) macrotrichia (long, slender hairs) and (2) microtrichia (hooklike hairs). Andersen and Polhemus (1976) reported that most water striders have hairs similar to those found by Cheng.

The gerrids differ from the families Corixidae, Nepidae, Belostomatidae, Ochteridae, Gelastocoridae, Naucoridae, Notonectidae, and Pleidae in having the antennae longer than the head. Gerrids differ from Salididae in having the hind coxae smaller, more conical or cylindrical, and freely rotatory as compared to salidids, which have transverse, fixed coxae. Gerrids differ from the Macroveliidae, Mesoveliiidae, Hebrididae, and Hydrometridae in having their tarsal claws inserted preapically on the last tarsal segment, a character shared with the family Velidiae. Although gerrids are similar to velidiae in general appearance, they differ markedly in the length of the hind femur. In Idaho velidiae, the hind femur scarcely, if at all, surpasses the tip of the abdomen, while in gerrids, the hind femur greatly exceeds the apex of the abdomen. Also, the middle legs are attached much closer to the hind legs in the gerrids; velidiae have the middle legs attached approximately midway between the front and hind legs. Gerrids have a single scent gland opening on the metasternum; velidiae have two scent gland openings, delineated by a pair of channels that run lateral and end anterior to the hind coxae. The most reliable criterion for separating these two families is the sclerotization of the vesica of the aedegus in gerrids and its absence in velidiae (Polhemus and Chapman 1979, China 1957). Female gerrids have the second gonocoxites absent, while velidiae have them well developed (Seudder 1959). The Idaho gerrids can easily be separated from the velidiae by the absence of the metathoracic scent gland channels.

**Key to the Species of Adult Idaho Gerrididae**

1. Inner margins of eyes sinuate or concave postero-medially in dorsal view (Fig. 1); first antennal segment shorter than remaining three combined; abdomen elongate, segments not dorsoventrally flattened; ground color black to brown with various gold markings .......................... 2

    — Inner margin of eyes convexly rounded postero-medially in dorsal view (Fig. 2); first antennal segment longer than remaining three combined; abdomen short, dorsoventrally flattened, appearing atrophied; ground color grey with black markings .......................... *Metrobates trifidus* *Usinger*

2(1). Length of first antennal segment less than segments two and three combined; males with abdominal sternite six evenly emarginate posteriorly (Fig. 3); female connexival spines of abdominal segment six reaching to or beyond middle of last genital segment (Fig. 4) .......................... *Linaeoporus notabilis* *(Drake & Hottes)*

    — Length of first antennal segment equal to or greater than segments two and three combined; male with abdominal sternite six sinuately emarginate posteriorly (Figs. 5, 9, 12, 17); female connexival spines of abdominal segment six not reaching middle of last genital segment .......................... 3

3(2). Species large (exceeding 12 mm); abdominal sternite seven of male with medial keel prominent and elevated (Fig. 5) .......................... *Gerris* *(Aquarius)* *remigis* *(Say*)

    — Species small (under 12 mm); abdominal sternite seven of male with medial keel slightly prominent (Figs. 12, 17) or absent (Fig. 9) .......................... 4

4(3). Pronotum entirely dark, lacking yellowish to russet brown anterolateral stripes immediately posterior to compound eyes; if pale stripes present, then basal three-fourths of first antennal segment with inner and outer surfaces having narrow, longitudinal, dark stripes (Fig. 7) .......................... 8
— Pronotum with yellowish to russet brown anterolateral stripes immediately posterior to compound eyes (Fig. 6); basal three-fourths of first antennal segment entirely black (Fig. 8) ... 5

5(4). Abdominal sternite seven of male as long as broad; posterior, median notch on abdominal sternite six subrectangular (Fig. 9); female with posterolateral angles of tergite six not produced into distinct connexival spines; abdominal sternite seven subrectangular, the posterior edges of each valve obtuse (Fig. 10),

... Gerris (Gerris) buenoi Kirkaldy — Abdominal sternite seven of male longer than broad; posterior, median notch on abdominal sternite six evenly rounded (Figs. 12, 17); female with posterolateral angles of tergite six produced into distinct connexival spines; abdominal sternite seven triangular, the posterior edges of each valve acute (Fig. 11) ... 6

6(5). Abdominal sternite seven of male with longitudinal rows of long hairs on either side of ventral keel (Fig. 12); pale area along dorsolateral margins of abdominal sternites extending the length of the abdomen (Fig. 13),

... Gerris (Gerris) incognatus Drake & Hottes — Abdominal sternite seven of male lacking long hairs on either side of ventral keel; pale area along dorsolateral margins of abdominal sternites only on segments five, six, and seven (Fig. 14) ... 7

7(6). Corners of abdominal tergites with tufts of silvery pubescence (visible only on dry, degreased specimens) (Fig. 15); connexival spines of female curving slightly inward and upward ...

... Gerris (Gerris) gilletti Lethierry & Severn — Corners of abdominal tergites without tufts of silvery pubescence; connexival spines of female pointed almost vertically ...

... Gerris (Gerris) pingreensis Drake & Hottes

8(4). Disc of pronotum with uniform, minute, gold specks not interrupted by two longitudinal bands of reflective, silvery setae (visible only on dry, degreased specimens); connexival spines of female strongly curved inward, not reaching apex of abdominal tergite seven ...

... Gerris (Gerris) incurvatus Drake & Hottes — Disc of pronotum with uniform, minute, gold specks interrupted by two longitudinal bands of reflective, silvery setae (Fig. 16) (visible only on dry, degreased specimens); connexival spines of female not strongly curved inward, reaching apex of abdominal tergite seven ...

9(8). Abdominal sternite seven of male with distinct, circular, raised tufts of hair on either side of median, ventral keel (Fig. 17); connexival spines of female strongly incurved with apices clothed with stiff hairs (Fig. 18) ... Gerris (Gerris) comatus Drake and Hottes

— Abdominal sternite seven of male lacking distinct tufts of hair on either side of median, ventral keel, connexival spines of female not strongly incurved with apices lacking stiff hairs (Fig. 19),

... Gerris (Gerris) marginitus Say

Subfamily Gerrinae

Andersen (1975) recognized one of two tribes (the Gerrini) and four genera in North America. The genera Limnoporus and Gerris are the only representatives of this subfamily and of the tribe Gerrini in Idaho.

Genus Gerris Fabricius

Gerris Fabricius, 1794. Entomol. Syst. 4: 188. Type species: Cimex lacastris Linnaeus, 1758. Designated by Latreille, 1810.

Aquarius Schellenberg, 1800. Das geschlecht der Land und Wasservanzen, p. 25 (= subgenus).


This is the most common and widely distributed genus of Gerridae in the world. Fifteen species are known from the Nearctic region, and nine were recorded from Idaho by Drake and Harris (1934). One of these was transferred to the genus Limnoporus by Andersen (1975). Two others, G. remigis Say and G. nyctalis Drake & Hottes, are combined under the former name in this paper following the suggestion of Stonedahl and Lattin (1982).

Gerris marginatus Say, recorded from Idaho by Drake and Harris (1934), is believed not to occur west of the Continental Divide except for a single specimen collected in western Montana. An additional three species are included in the key as possibly occurring in the state. Sprague (1967), Scudder and Jamieson (1972), and Calabrese (1974a) described the nymphs of most North American species.

Gerris (Aquarius) remigis Say

Figs. 1, 5


The large size of this transcontinental species (length 11.0–16.6 mm, width 3–4 mm)
makes it easy to distinguish in the field from other species of *Gerris*. This species is more robust and shorter than members of the genus *Limnoporus*. It is the most abundant and widely distributed species of gerrid in the state. Macropterous and apterous forms have been collected in Idaho. Brachypterous forms occur rarely in the Pacific Northwest (Stonedahl and Lattin 1982), but remain uncollected in Idaho. Torre-Bueno (1917a), Scudder and Jamieson (1972), and Calabrese (1974a) described the nymphs.

**Geographic Range.**—Reported from the 48 contiguous states, Canada, Mexico, and Guatemala (Drake and Harris 1934). As defined here and by Stonedahl and Lattin (1982), *G. remigis* includes several forms from different regions of North America. Several of these forms have been described as distinct species and subspecies: *Gerris orba* Stål (1859) from San Francisco, California, and *G. remigis caloregon* Calabrese (1974b) from California and Oregon. In addition, *Gerris nyctalis* Drake & Hottes (1925a) was described from the U.S. National Park near Estes Park, Colorado, which is in the Rocky Mountains east of the Continental Divide. Michel (1962) reported a *remigis*-like form in Arizona, Texas, and Virginia. He claimed definite differences in internal genitalia in eastern vs. western forms, but apparently without examining type material or specimens from the type locality. Drake and Harris noted the occurrence of *G. nyctalis* in lakes at high elevations in the Rocky Mountain regions, including Idaho. An intensive study will be necessary to determine the true taxonomic status of these forms. In this paper we will call this polymorphic species *Gerris remigis* Say, as proposed by Stonedahl and Lattin (1982).

**Idaho Records.**—Specimens have been collected on ponds, lakes, and reservoirs in protected, vegetated areas in 15 counties: Bear Lake, Benewah, Blaine, Bonner, Boundary, Canyon, Cassia, Custer, Franklin, Fremont, Kootenai, Latah, Owyhee, Payette, and Valley. Adults have been collected from March through September, nymphs from June through August.

*Gerris (Gerris) buenoi* Kirkaldy

Figs. 7, 9, 10


The broad, rectangular notch at the apex of sternum seven of the male and the female’s lack of spinelike, lateral prolongations on tergum six, combined with the presence of the anterolateral, pale, pronotal stripe and its small size (length 6.5–8.2 mm, width 1.3–1.6 mm) separate this species from other Idaho gerrids. Only macropterous and brachypterous forms have been collected in Idaho and the Pacific Northwest.

**Geographic Range.**—Transcontinental in southern Canada and the northern United States from British Columbia east to New Jersey (Torre-Bueno 1911) and Massachusetts (Parshley 1916), southward into California (Polhemus and Chapman 1979) and Colorado (Drake and Harris 1928).

**Idaho Records.**—Specimens have been collected on ponds, lakes, and reservoirs protected, vegetated areas in 15 counties: Bear Lake, Benewah, Blaine, Bonner, Boundary, Canyon, Cassia, Custer, Franklin, Fremont, Kootenai, Latah, Owyhee, Payette, and Valley. Adults have been collected from March through September, nymphs from June through August.

*Gerris (Gerris) comatus* Drake & Hottes

Figs. 17, 18


The females of this medium-sized species (length 7.3–9.3 mm, width 2.3–2.8 mm) are easily confused with those of *G. marginatus* Say, as both lack the anterolateral stripes on the pronotum, with the exception of the *mickeli* variety listed above. Specimens of this morph have thus far all proven to be brachypterous females. This striped morph may be the result of a recessive gene surfaceing because of seasonal or environmental factors as it
Figs. 9–19. 9, Gerris buenoi, ventral view of male abdominal apex; 10, Gerris buenoi, ventral view of female abdominal apex; 11, Gerris gillettei, ventral view of female abdominal apex; 12, Gerris incognitus, ventral view of male abdominal apex; 13, gerris incognitus, lateral view of abdomen; 14, Gerris gillettei, lateral view of abdomen; 15, Gerris gillettei, dorsal view of abdomen; 16, Gerris marginatus, dorsal view of head and pronotum; 17, Gerris comatus, ventral view of male abdominal apex; 18, Gerris comatus, dorsal view of female abdominal apex; 19, Gerris marginatus, dorsal view of female abdominal apex.
did with a similar problem in *Gerris incurvatus* Drake & Hottes (Biggam and Stock 1988). Electrophoretic analyses will probably resolve this problem. Females of normal *G. comatus* have the connexival spines short and slightly curved medially and have apical tufts of long, stiff hair; *G. marginatus* females usually have straight connexival spines with apical tufts of sparse, short hairs, similar in length to the hair on the entire spine. Male *G. comatus* have characteristic, circular tufts of long hair on the venter of abdominal segment seven on either side of the median keel. *Gerris marginatus* males lack these tufts, having only short, apressed pubescence. Another species possibly confused in some literature, *G. incurvatus* Drake & Hottes, also lacks the anterolateral, pronotal stripes but can now be easily separated from *G. comatus* and *G. marginatus* by pronotal pubescence. Dry, degreased specimens of *G. incurvatus* have only minute gold flecks, while *G. comatus* and *G. marginatus* have golden flecks interrupted by streaks or bands of reflective silvery setae. This is a new character previously unreported in literature. Aperous, brachypterous, and macropterous forms are known. The nymphs were described by Scudder and Jamieson (1972).

**Geographic range.**—Recorded from the Atlantic Ocean west to Montana, including New York, Iowa, South Dakota, Minnesota, Kansas, Missouri, Nebraska, Colorado, Indiana, Michigan, Pennsylvania, Ohio, Illinois, New Jersey, Maryland, and Ontario (Drake and Harris 1934), British Columbia (Scudder 1971), Quebec (Moore 1950), Alberta (Strickland 1953), Manitoba and Saskatchewan (Brooks and Kelton 1967), and Arizona, Connecticut, Florida, Oklahoma, New Hampshire, New Mexico, South Carolina, Virginia, Wisconsin, and Wyoming (Smith 1988). The subspecies *G. comatus mickeli* Drake & Hottes has been recorded from Minnesota (Drake and Hottes 1925b), as var. *mickeli* and Oregon and Colorado (Drake and Harris 1928). The Drake & Hottes subspecies, of which only brachypterous females are known, atypically has the anterolateral, pronotal stripe. Stonedahl proposed that the *G. comatus mickeli* recorded by Drake and Hottes from Oregon was probably a misidentified *G. incurvatus*, as they found no *G. comatus* in Oregon or Washington (personal communication).

Roemhild (1976) collected *G. comatus* in Montana; all specimens were taken east of the Continental Divide. Scudder (1971) listed *G. comatus* from British Columbia, Canada, which we have confirmed from specimens donated by the University of British Columbia in Vancouver. Due to their close proximity, we have included it here and in our key as a possible Idaho inhabitant.

**Idaho records.**—None to date.

**Gerris (Gerris) gillettei** Lethierry & Severin

Figs. 11, 14, 15


The presence of conspicuous patches of silvery pubescence on the tergal corners of the abdomen in dry, degreased specimens will separate this species from the very similar *G. pingreensis* Drake & Hottes. Callahan (1974) stated that females of *G. gillettei* are larger on the average (10.3 mm) than females of *G. incognitus* Drake & Hottes (9.1 mm). Also, *G. gillettei* females are paler ventrally than those of *G. incognitus*. This color character was confirmed by Stonedahl and Latting (1982). The males are easily distinguished by the presence of tufts of long hair ventrally on either side of the keel on abdominal segment seven in *G. incognitus*, and by the absence of such tufts in *G. gillettei*. *Gerris gillettei* is a medium-sized gerrid (length 8.5–11.5 mm, width 1.7–2.3 mm). The anterolateral stripe on the pronotum is present. Macropterous and apterous forms have been taken in the state, but nymphs have not yet been described.

**Geographic range.**—California, Colorado, Montana, Oregon, Texas, Utah, and Washington (Drake and Harris 1934), Wyoming (Kuitert 1942), Nevada (Polhemus and Chapman 1979), and British Columbia (Smith 1988). Drake and Harris (1934) recorded *G. pingreensis* from the higher altitudes of Idaho. We have not seen true *G. pingreensis* from Idaho and believe their specimens, which we have been unable to locate, are probably *G. gillettei* Lethierry & Severin.

**Idaho records.**—Specimens have been collected on lakes, ponds, and reservoirs in
Gerris (Gerris) incognitus Drake & Hottes

Figs. 8, 12, 13


The longitudinal rows of long hairs lateral to the ventral keel of the male abdominal segment eight, combined with the presence of the anterolateral pronotal stripes, will easily separate this species from all other male gerrids of this size (length 6.7–11.0 mm, width 2.5–2.9 mm) found in the state. Callahan (1974) stated that females of G. incognitus are smaller and darker ventrally than females of G. gillettei Lethierry & Severin. Stone Dahl and Lattin (1982) showed the light, dorso-lateral, abdominal stripe extending the entire length of the abdomen (Fig. 13). Macropterous and apterous specimens are known from Idaho. Scudder and Jamieson (1972) and Spence and Seudder (1978) described the nymphs.

Geographic Range.—California, Idaho, Montana, Oregon, Washington, British Columbia, and Quebec (Drake and Harris 1934), Colorado and Wyoming (Kuitert 1942), Nevada (Polhemus and Chapman 1979), and Alberta, Manitoba, Ontario, and Saskatchewan (Smith 1988).

Idaho Records.—This species has been collected on ponds, lakes, and reservoirs in 20 counties: Bear Lake, Benewah, Blaine, Bonner, Bonneville, Boundary, Caribou, Cassia, Clearwater, Custer, Fremont, Gooding, Idaho, Latah, Lemhi, Owyhee, Shoshone, Teton, Twin Falls, and Valley. Adults were collected from March through September, nymphs from May through August.

Gerris (Gerris) incurvatus Drake & Hottes

Fig. 6


The lack of pale, anterolateral stripes on the pronotum and the strongly incurved lateral spines of the female abdominal segment seven make this small species (length 7.6–10.7 mm, width 2.3–2.5 mm) easy to identify. It can be confused with G. marginatus Say, especially the males, as the external genitalia are similar and both species lack the anterolateral, pronotal stripe. The new character, mentioned under G. comatus, has been consistent in over 60 confirmed specimens of G. marginatus and G. comatus; both species have two stripes or bands of silvery pubescence interrupting the uniform covering of golden flecks found on the pronotum. This character has proven to be consistent for both sexes with midwestern and eastern specimens examined by Gary Stone Dahl (New York) and Jack Lattin (Oregon) (personal communication). Gerris incurvatus, on the other hand, has no silvery pubescence on the pronotum, only uniform, short, golden pubescence characteristic of the subgenus Gerris. This character is important in separating rare and uncommon, brachypterous female forms of G. incurvatus that have pronotal stripes, yet have the strongly incurved connexival spines. This rare form appears to be a genetic, seasonally induced morph (Biggam and Stock 1985). Macropterous and brachypterous forms have been collected in Idaho. Scudder and Jamieson (1972) described the nymphs.

Geographic Range.—California, Idaho, Illinois, Montana, Oregon, Washington, and British Columbia (Drake and Harris 1934), Texas and Wyoming (Kuitert 1942), and Nevada (Polhemus and Chapman 1979). Although Drake and Harris (1934) listed this species from Illinois, it was not found in Indiana (Deay and Gould 1936), Missouri (Froeschner 1962), Wisconsin (Hilsenhoff 1986), or Ohio (Osborn and Drake 1915).

Idaho Records.—Specimens have been collected on ponds, lakes, and reservoirs in 23 counties: Ada, Adams, Bannock, Benewah, Blaine, Bonner, Bonneville, Boundary, Caribou, Cassia, Clearwater, Custer, Fremont, Gooding, Idaho, Latah, Lemhi, Owyhee, Shoshone, Teton, Twin Falls, and Valley. Adults have been collected from March through October, nymphs from May through August.

Gerris (Gerris) marginatus Say

Figs. 16, 19

Gerris marginatus Say, 1832. Descriptions of new species of heteropterous Hemiptera of North America, New Harmony, Indiana, p. 36 (Fitch reprint,
This medium-sized water strider (length 8.0–10.5 mm, width 2.3–2.6 mm) reportedly lacks the anterolateral stripe on the pronotum that is common in most individuals of G. incurvatus Drake & Hottes and G. comatus Drake & Hottes. However, since the latter two species include some brachypterous individuals with pronotal stripes, similar individuals of G. marginatus may yet be discovered. It is easily separated from G. incurvatus by the presence of two longitudinal bands of longer, silvery pubescence on the pronotum. This character also occurs in G. comatus; however, the males of G. comatus have circular tufts of hair ventrally on abdominal sternum eight. Males of G. marginatus do not have this character. The females of G. marginatus have the connexival spines rather straight, slightly upturned, and without strong setae at the tips. Females of G. comatus have the spines curving slightly inward and tipped with strong setae.

**Geographic Range.**—Drake and Harris (1934) reported this species occurring in every state in the United States and in Canada, Mexico, and Brazil. As mentioned in the biology section, pertinent literature concerning this species is confusing, and we suspect that two or more species may have been involved in the reportings of earlier workers (Drake and Harris 1934). This may be true of the Torre-Bueno (1917b) paper on the immature stages and life history of G. marginatus.

Stonedahl and Lattin (1982) believed the Oregon and Washington records of Drake and Harris (1934) to be G. incurvatus, which apparently replaces G. marginatus in the West. Roemhild (1976) recorded G. marginatus from Montana. From his identified material, only a single specimen was recorded west of the Continental Divide. The close proximity of this species to Idaho prompts us to include it in our key as a possible inhabitant of the state.

**Idaho Records.**—None.

Gerris **pingreensis** Drake & Hottes


This species is easily confused with G. gillettei Lethierry & Severin. Although G. pingreensis and G. gillettei are readily separated by the conspicuous silvery patches of setae at the dorsolateral tergal apices on G. gillettei and their absence on G. pingreensis, confusion between the two species may be the result of grease or liquid preservatives that conceal these silvery hairs. Gerris pingreensis is similar in size to G. buenoi Kirkaldy (length 9.0–10.00 mm, width 2.0–2.5 mm). Macropetalous and aperrous forms are known for this species (Drake and Hottes 1925a). Scudder and Jamieson (1972) and Spence and Scudder (1978) described the nymphs.

**Genus Limnoporus Stål**


Andersen (1975) elevated this subgenus of Gerris to generic status. The proportions of the antennal segments serve to separate it from the closely related Gerris spp. Four species are recorded from the Americas, all Neartic. Only one species is recorded from Idaho.

**Limnoporus notabilis** (Drake & Hottes)

Figs. 3, 4


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This is the largest gerrid in the state (length 14.4–20.0 mm, width 2.0–2.5 mm). Its long, slender body and legs make it distinctive and easily separated from members of the genus Gerris. Sternum six of the males is not secondarily notched as in Gerris males. The very similar L. dissortis Drake & Harris, which occurs in the Midwest up to the Rockies, may be confused with notabilis because of the similar color pattern. However, L. dissortis is a smaller species with shorter legs than L. notabilis. The antennal segment ratios as described by Drake and Harris (1934) appear to be the best character for separating L. notabilis and L. dissortis, the latter being reported from British Columbia by Scudder (1977). The occurrence of hybrids between these two species in British Columbia (Spence and Madison 1986) further complicates distribution records. Idaho L. notabilis have the third and fourth antennal segments subequal and each shorter than the second segment. Limnopus dissortis has the second and fourth segments subequal, each longer than the third segment. Only the macropterous form is known in Idaho and the Pacific Northwest. Scudder and Jamieson (1972) described the nymphs.

Geographic Range.—California, Colorado, Idaho, Iowa, Oregon, Montana, Utah, Washington, Wyoming, and British Columbia (Drake and Harris 1934), Colorado (Drake and Harris 1935), Arizona and South Dakota (Kuitert 1942), Alberta (Brooks and Kelton 1967), and New Mexico (Smith 1958). Drake and Harris (1930) list this species as western and occurring as far east as Iowa.

Idaho Records.—This species has been collected on ponds, lakes, reservoirs, and slower moving streams and rivers in 30 counties: Ada, Adams, Bear Lake, Benewah, Blaine, Boise, Bonner, Bonneville, Boundary, Butte, Camas, Canyon, Caribou, Cassia, Clark, Custer, Elmore, Franklin, Fremont, Gem, Gooding, Idaho, Kootenai, Latah, Nez Perce, Owyhee, Payette, Shoshone, Valley, and Washington. Adults were collected from March through October, nymphs in August.

Subfamily Trepobatinae

Two of the 13 genera in this subfamily occur in North America. Only one is found in Idaho.

Genus Metrobates Uhler

Type species: Metrobates hesperius Uhler, 1871b, monotypic.


Members of this genus have short, broad, dorsoventrally flattened abdomens. The second and third antennal segments of the male are swollen distally. The body is grey with black markings. These bugs prefer large rivers with moderate currents. Worldwide there are 14 recognized species with four subspecies. Five species occur in the United States; one species and its subspecies occur in Idaho. The genus was last revised by Anderson (1932) and Drake and Harris (1932).

Metrobates trux infuscatus Usinger  
Fig. 2


The short, broad, dorsoventrally flattened abdomen (length 4.0–4.6 mm) and the grey color with black markings, combined with the extremely long legs, make this unique species the most easily identified gerrid in Idaho. Apterous and rarely macropterous forms have been collected in Idaho. Nymphs of this species have not been described.

Geographic Range.—Central and northern California (Polhemus and Chapman 1979, Usinger 1953), Idaho, Washington, and Wyoming (Polhemus and Chapman 1979), Oregon (Stonedahl and Lattin 1982), and New Mexico and Arizona (Smith 1958).

Smith (1988) listed the subspecies M. trux trux (Torre-Bueno) from Idaho as well as Arizona, California, Colorado, Kansas, New Mexico, and Texas. Drake and Harris (1932) stated that the second antennal segment of the Texas specimens was, at least in part, yellowish brown, unlike those of Oregon and Idaho specimens. Usinger (1953) described M. trux infuscatus from specimens originally determined by H. B. Hungerford and L. D. Anderson as "M. trux Bueno," noting the darker markings of the upper surface as being more extensive than the typical form described from Colorado and recorded from Texas, Kansas, Arizona, and, apparently erroneously, Oregon and Idaho. Based on our examination of available Idaho material and Polhemus and
Chapman (1979), we suggest that *M. trux* specimens collected and identified from Oregon and Idaho prior to Usinger’s description of *M. trux infuscatus* (1953) are probably the latter subspecies, despite confusion in the literature. The deletion of Idaho as a locality for *M. trux trux* (Torre-Bueno) appears advisable, leaving Arizona, (southern) California, Colorado, Kansas, New Mexico, and Texas as the more likely distribution of this subspecies. Stonedahl and Lattin (1982) contend that *M. trux infuscatus* Usinger is the only subspecies occurring in the Pacific Northwest.

**IDAHO RECORDS.—** This unique species has been collected on major rivers and creeks in moderate currents in four counties: Benewah, Clearwater, Latah, and Owyhee. Adults have been collected in August and September, nymphs in July and August.

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