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Three Palearctic species of *Rugilus* Leach in North America (Coleoptera: Staphylinidae, Paederinae): redescriptions, new synonymy, and new records

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Abstract: Redescriptions, new synonymy, new North American records (including maps), notes on habitat preferences, and remarks on the status of three Palearctic species of *Rugilus* in North America are provided. The widespread Palearctic *R. orbiculatus* (Paykull) is reported for the first time from North America from numerous eastern and western localities. *Rugilus latiscutellus* (Casey, 1884) and *R. oregonus* (Casey, 1905) are shown to be conspecific with *R. orbiculatus* (Paykull, 1789) (NEW SYNONYMY); a lectotype for *R. latiscutellus* is designated. *Rugilus rufipes* Germain, an immigrant species known previously only from Washington and Ontario, is newly recorded from Quebec. *Rugilus fragilis* (Graevenhorst), recorded previously only from eastern Canada, is listed for the first time from the United States (Maine and New York).

Introduction

Members of the paederine genus *Rugilus* Leach are remarkably characteristic rove beetles because of their large heads that are often broader than the elytra, their exceedingly narrow necks, their strongly narrowed pronota, their coarsely punctate heads and pronota, and their broadly expanded prosterna. These staphylinids, which resemble large ants (Fowler, 1888), generally inhabit woodlands, edges of fields and meadows. They are active predators in and among wet debris, such as under leaves, compost heaps, and other decaying organic matter (Doháč, 1985b). This genus of more than 250 species is recognized from most tropical and temperate regions of the world, except Australia and New Zealand (Coiffait, 1984). The North American species have never been revised. Twelve species were listed from America north of Mexico by Moore & Legner (1975).

The three Palearctic species of *Rugilus* established in North America are here redescribed and illustrated, new and old geographic records are recorded and mapped, and their native Old World distribution and bionomics are summarized. An evaluation of their adventive status in North America is also provided. With two species names synonymized herein and *R. orbiculatus* newly recorded from the New World, the number of North American *Rugilus* now stands at 11 species.

*Rugilus orbiculatus* (Paykull) (Figs. 1-4; Map 1)

*Staphylinus orbiculatus* Paykull, 1789:35. TYPE LOCALITY: Upland, Sweden. Type not examined.


*Stilicus oregonus* Casey, 1905:221. TYPE LOCALITY: Oregon (Albany). Holotype, female, USNM (Washington, D.C.). Type examined. NEW SYNONYMY.

*Rugilus orbiculatus* (Paykull) occurs widely throughout the western Palearctic region and is considered adventive in Australia (Horion, 1965; Coiffait, 1984). Specimens of *R. orbiculatus*, recently collected by the author in the Finger Lakes region of central New York, were confidently identified by examination of the male aedeagus.

A cursory inspection of other identified North American species of *Rugilus* revealed a very close
similarity between *R. orbiculatus* and two Casey species: *R. latiusculus* in eastern North America and *R. oregonus* in western North America. Study of the male aedeagus of these three taxa, including the type series of each, indicates that only one species is involved, the two Casey names becoming junior synonyms of *R. orbiculatus*.

**Redescription:** Habitus as in Fig. 1. Body generally blackish to black-pitch. Apical margins of elytra yellowish. Legs, tarsi, antennae, and apical margins of femora, tibiae and last maxillary palpal segment more or less darkened, infuscate. Length 3.5-4.5 mm.

Head, excluding mouthparts, as long as wide, posterior angles rounded, subtruncate at base. Temples as long as eyes. Eyes large, very prominent. Surface of head (Fig. 2) covered with umbilicate punctures, distinctly coarse, and more or less longitudinally confluent.

Pronotum longer than wide, with greatest width nearest anterior 1/4; surface covered with coarse, dense punctures, but generally not confluent, also with median, longitudinal band, smooth and glossy, finely furrowed at middle.

Elytra quadrate, slightly wider than head; surface glossy, covered with fine, moderately dense punctures.

Abdominal terga covered with very fine, dense punctation.

**Male:** Anterior tarsus feebly enlarged, as wide as apex of tibia. Abdomen: Sternum IV unmodified. Sternum V feebly sinuate at middle. Sternum VI deeply notched at middle. Aedeagus as in Figs. 3-4.

**Female:** Tarsi and apical abdominal sterna unmodified.

**Habitat:** This species occurs in most types of decaying organic matter, such as compost and grass heaps, rotted hay and straw, old mushroom, hay stacks, leaves, and especially in leaf litter and other debris around water and damp habitats. Adults are found throughout the year (Roha, 1985b).

**Geographic Distribution:** Commonly encountered and widespread in the western Palearctic region, *R. orbiculatus* occurs in the British Isles (England, Scotland, Ireland), all of continental Europe, north Africa, the North Atlantic islands (Canary Islands, Azores, Madeira), Cyprus, Asia Minor, Caucasus, Transcaucasian Region, and southern Siberia; it is an immigrant in Australia (Horion, 1965; Coiffart, 1984).

This species, now widely distributed in western and eastern North America (Map 1), shows a typical distribution pattern for an adventive species.


Remarks: With the North American R. latiusculus and R. oregonus synonymized with the widespread Palearctic R. orbiculatus, the question of its North American origin is raised.

Most available second-hand evidence — current geographic pattern, abundance, and ecology — suggests that R. orbiculatus is adventive in North America, probably having been accidentally transported in commerce. In fact, Lindroth (1957:187) recorded R. orbiculatus (cited as Stilicus) in a list "of animals on the ballast-places of SW England." The British Isles, specifically southwestern England, have been implicated "as the main region of departure for animals which have been unintentionally introduced from Europe into North America," (Lindroth, 1957:172). Using ground beetles (Carabidae) for his chief body of evidence, Lindroth convincingly demonstrated that New England (and the Canadian Maritime provinces) served "as a gateway for European introductions..." and that...
the Pacific Northwest also was (and is) an “important reception area for European introductions.”

From an ecological perspective, the evidence also points toward an immigrant status for *R. orbiculatus* in North America. This paederine staphylinid is terricolous or ground-dwelling, mesophilous (possessing intermediate moisture requirements), and is generally found on waste ground — three important attributes that favor success or survivability during transport in ballast (Lindroth, 1957).

Another biogeographic hypothesis, however, should be considered. That *R. orbiculatus* is also recorded from Alaska (Bousquet, 1991, cited as *oregonus*) suggests this and other Pacific Northwest populations are indigenous. But the northeastern populations could also suggest multiple introductions into eastern North America and may better explain such a disjunction in its Nearctic distribution. Additional collecting may reveal a transcontinental distribution in northern United States and Canada, thus providing further evidence for an indigenous, or naturally Holarctic, origin in North America. However, the absence of this species from key Beringian or far eastern Palearctic regions (only western and central Europe) weakens the possibility of a naturally Holarctic origin.

Lawrence, Kansas (1933), the westernmost population of *R. orbiculatus* in the East, is separated from the nearest western populations at Mantua, Utah (1939) by at least 1312 kilometers (or 937 miles). This “disjunct” distribution pattern would be best explained by a theory of early, multiple introductions into western and eastern North America.

*Rugilus rufipes* Germar

(Figs. 5-9; Map 2)

*Rugilus rufipes* Germar, 1836:4. TYPE LOCALITY: Austria. Type not examined.

This widespread Palearctic species was previously recorded in North America from Washington state (Moore and Legner, 1975:136) and, more recently, from Ontario (Bousquet, 1991). Kellner and Dettner (1992) resurrected the genus *Stilicosoma* from synonymy with *Rugilus*. They considered that the type species of *Stilicosoma* (*R. rufipes*) does not belong to *Rugilus* on the basis of its divergent general habitus, the presence of 4 labral denticles (in constrast to 2 in *Rugilus s. str.*), and an accumulation of pores at sternite 4 (in contrast to median glands at sternites 4 and 5 in *Rugilus s. str.*). However, pending a comprehensive revision of the Neartic species, I shall recognize *rufipes* in the genus *Rugilus*.

Redescription: Habitus as in Fig. 5. Body rather robust and uniformly dark reddish brown to black. Legs, antennae, and mouthparts pale reddish brown. Length 6.0-6.5 mm.

Head, excluding mouthparts, slightly longer than long; posterior angles broadly and obtusely rounded; posterior margin truncate. Temples slightly longer than eyes. Surface of head (Fig. 6) uniformly covered with dense, coarse, more or less confluent, punctures.

Pronotum slightly longer than wide, its greatest width at about 1/5 from anterior margin, lateral margins beyond middle slightly convergent to base, abruptly narrowed at posterior angles. Surface uniformly covered with punctuation resembling that of head; with a broad, smooth, slightly raised, median band in posterior 3/4.

Elytra slightly longer than wide, and wider than head. Surface uniformly covered with fine, dense punctures, slightly finer at apical margin.

Abdomen uniformly finely and densely punctured.

**Male:** Anterior tarsus feebly enlarged, slightly wider than apex of tibia. Abdomen: Sternum IV unmodified. Apical margin of visible sternum V slightly sinuate at middle. Sternum VI moderately deeply notched (Fig. 7). Aedeagus as in Figs. 8-9.

**Female:** Tarsi and apical abdominal sterna unmodified.

**Habitat:** In the Palearctic region, *R. rufipes* inhabits both dry and wet habitats, such as meadows, fields, forests, forest-steppe, hilly steppe and heath land, living among decaying organic matter, compost heaps, under stones, and leaves. Adults occur throughout the year, with peak occurrence in the spring and autumn (Bohac, 1985b).

**Geographic Distribution:** Widely distributed throughout western Europe (Horion, 1965; Coiffait, 1984). *R. rufipes* is known from Scotland, England (Joy, 1932), Norway, Sweden, Finland, France
In North America, *R. rufipes* shows a limited distribution pattern in the Northeast (Map 2); a record from the Pacific Northwest (Washington) is unconfirmed (Moore and Legner, 1975).


**Remarks:** In Czechoslovakia and elsewhere in western Europe, *R. rufipes* (like *R. orbiculatus*) is considered to have a "wide ecological valence" (Bohac, 1985a:364) and capable of inhabiting "both moist and dry habitats of different types and ... (is) typical also of cultivated fields and ruderals." This ecological evidence, its "ubiquitous species" status (Bohac, 1985a), its limited "disjunct" pattern in North America, as well as its partly synanthropic habits, clearly support an adventive status in North America.

**Rugilus fragilis** (Gravenhorst)

(Figs. 10-14; Map 3)


*Paederus fragilis* Gravenhorst, 1806:140. TYPE LOCALITY: Paris. Type not examined.

Because of its unique coloration (i.e., reddish-orange pronotum contracting with dark reddish brown to piceous body), large size (5.5-6.5 mm), and distinctive (visible) male abdominal sterna IV-VI and aedeagus, this adventive species is not likely to be confused with any other described North American *Rugilus*.

Recently, I collected a short series of specimens in central New York at a windowpane of an outdoor shed. Upon further inspection of sorted and unsorted Staphylinidae in the Cornell University Insect Collection (CUIC), additional specimens were discovered. Initially, they could not be accurately assigned to any described or recorded species of North American *Rugilus*; further investigation soon proved these specimens to be conspecific with examples of the Palearctic *R. fragilis* (=angustatus of most European authors). An examination of the identified and unidentified staphylinids in the Canadian National Collection of Insects, Ottawa (CNCI) revealed additional specimens, which undoubtedly represented the basis for the Canadian records reported in Bousquet (1991).

**Redescription:** Habitus as in Fig. 10. Head, elytra, and abdomen dark reddish brown, piceous, or blackish. Apical margin of elytra pale testaceous. Humeri, sometimes elytral bases, and extreme base of head narrowly brown-ocher. Pronotum usually orange or reddish. Legs, antennae, and mouthparts reddish brown. Length 5.5-6.5 mm.

Head, excluding mouthparts, slightly longer than wide, posterior angles very broadly rounded. Temples nearly 2 x longer than eyes. Surface of head (Fig. 11) uniformly covered with coarse, dense, and more or less confluent punctures, slightly polished.

Pronotum oblong, not quite as wide as head, its greatest width slightly in front of middle. Surface uniformly covered with prominent punctures, but slightly coarser, and little less dense than on head; smooth, median band lacking punctures, very finely grooved along midline.

Elytra slightly longer than wide, distinctly broader than head, uniformly covered with coarse, dense punctures; punctures very fine along posterior margin.

Abdomen somewhat polished, covered with very fine, dense punctures.

**Male:** Anterior tarsus scarcely enlarged, narrower than apex of tibia. Abdomen: Sternum IV at middle of apical margin with smooth and glossy, small, flat, reddish tubercle, surrounded by fringe of long setae (Fig. 12). Sternum V with distinct, large, deep
and polished impression (Fig. 12). Sternum VI bluntly, triangularly notched (similar to Fig. 7). Aedeagus as in Figs. 13-14.

**Female:** Tarsi and apical abdominal sternae unmodified.

**Habitat:** Throughout the Palearctic region, *R. fragilis* occurs along banks of watercourses and in meadows, forest borders, living under decaying organic matter, such as leaves. In Europe, adult incidence attains two peaks — March to June, and October to December (Dohal 1985).

**Geographic Distribution:** *Rugilus fragilis* is common throughout western Europe (Horion, 1965), known from southern England (Joy, 1932), Holland, Belgium, France (Portevin, 1929), Germany, Austria, Poland, Switzerland, Hungary, Czechoslovakia, Spain and Russia (Borchert, 1938), Greece (Oertzen, 1886), Corsica, Sardinia, Sicily, and Italy (Porta, 1926), and Finland and Sweden (Palm, 1963).

The species is probably adventive in eastern North America (Ontario, Quebec, Nova Scotia, Maine, New York) (Map 3), with the earliest known collection from Prince Edward County, Ontario, April 1950.


**Remarks:** With little doubt, *R. fragilis* was unintentionally introduced into eastern North America with early commerce. New records from other eastern Canadian localities, as well as new localities in the eastern United States (Maine and New York), document the establishment and range expansion of this adventive species.

**Acknowledgments**

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Fig. 1: *Rugilus orbiculatus* (Paykull). Dorsal habitus, composite scanning electron photomicrograph, 49X.

Fig. 2: *Rugilus orbiculatus* (Paykull). Head, dorsal aspect, 65X.

Fig. 5: *Rugilus rufipes* Germar. Dorsal habitus, composite scanning electron photomicrograph, 48X.

Figs. 6-7: *Rugilus rufipes* Germar. 6. Head, dorsal aspect, 75X. 7. Abdominal sterna IV-VI, male, 65X.

Fig. 10. *Rugilus fragilis* (Gravenhorst). Dorsal habitus, composite scanning electron photomicrograph, 48X.

Figs. 11-12: *Rugilus fragilis* (Gravenhorst). 11. Head, dorsal aspect, 94X. 12. Abdominal sternum III-V, male, 65X.

Map 1: Known North American distribution of *Rugilus orbiculatus* (Paykull).

Map 2: Known North American distribution of *Rugilus rufipes* Germar.