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Geographic distribution of *Clethrionomys* species

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A brief survey of the genus *Clethrionomys* is given. Maps of distribution are provided for the four most studied species (*C. gapperi, C. glareolus, C. rufocanus* and *C. rutilus*). Comments to the population dynamical patterns are also given.

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The genus *Clethrionomys* Tilesius, 1850, belongs, according to Honacki et al. (1982), to the family Arvicolidae of the order Rodentia. According to Corbet (1978:97) *Clethrionomys* includes *Caryomys, Craseomys, Evotomys* and *Neoaschizomys*. Corbet (1978:97-98 & 100) also includes *Eothenomys andersoni* in *Clethrionomys* as *C. andersoni*. Beside *E. andersoni* (or *C. andersoni*), *Eothenomys* includes 11 Eurasian species (see, e.g., Honacki et al. 1982). Walker et al. (1964) placed *Clethrionomys* in the family Cricetidae. As members of the microtines (i.e., voles and lemmings), *Clethrionomys* species are well known for their rather extensive density fluctuations or cycles.

A summary account of the various *Clethrionomys* species, their taxonomy and geographic distribution is given in Table 1. As can be seen from that table, this genus contains seven species, two of which belong exclusively to the Palearctic geographic region (*C. glareolus* and *C. rufocanus*), two species which exclusively belong to the New World (*C. californicus* and *C. gapperi*), one species which exclusively belongs to Japan (*C. andersoni*), one species which exclusively belongs to a restricted region of USSR and China (*C. centralis*), and finally one species which occurs in the entire Holarctic region (*C. rutilus*). Of these species, *C. gapperi, C. glareolus, C. rufocanus* and *C. rutilus* have been studied most extensively, particularly from an ecological point of view; distribution maps for these four species are given in Figs. 1-4.

As is indicated in Table 1, *C. glareolus* and *C. rutilus* are known to exhibit cyclic density changes in some parts of their geographic ranges and fairly stable densities (or non-cycling density changes) in other parts of their ranges. A gradient of stable to cyclic populations of *C. glareolus* is particularly well studied (e.g., Hansson 1979; see also Bujalska 1985). *Clethrionomys rufocanus* exhibits — as far as we know — cyclic density changes throughout its range, whereas *C. gapperi* is considered to be non-cyclic (and is, in fact, found to be very stable) throughout its range (e.g., Merritt 1981, Henttonen et al. 1985; see also Table 1).

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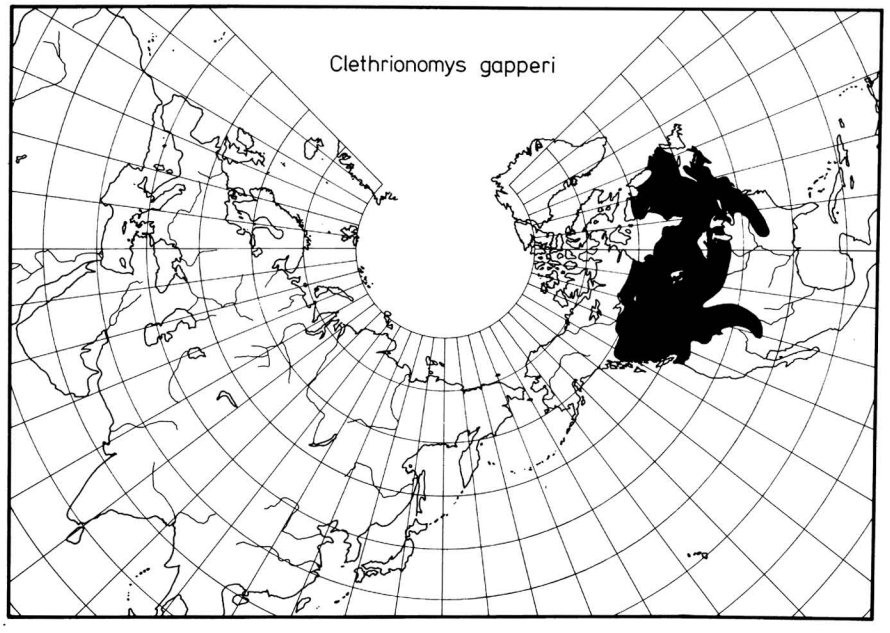

Fig. 1. Distribution of *Clethrionomys gapperi*. Based on Map 446 in Hall (1981:782) and on Honacki et al. (1982).

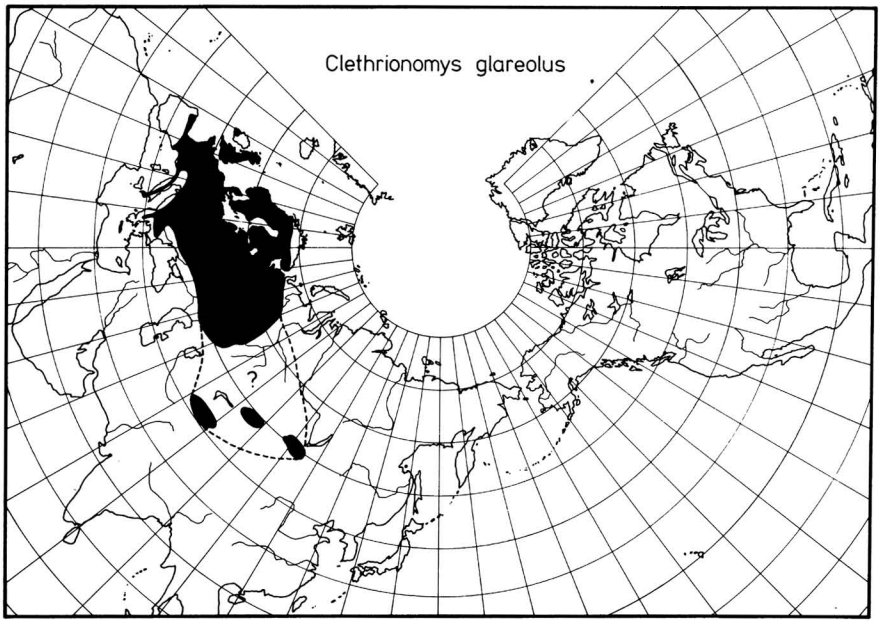

Fig. 2. Distribution of *Clethrionomys glareolus*. Based on Map 45 in Corbet (1978:242), Map 106 in Bobrinskij et al. (1965), Map 47 in Niethammer & Krapp (1982) and on Honacki et al. (1982).

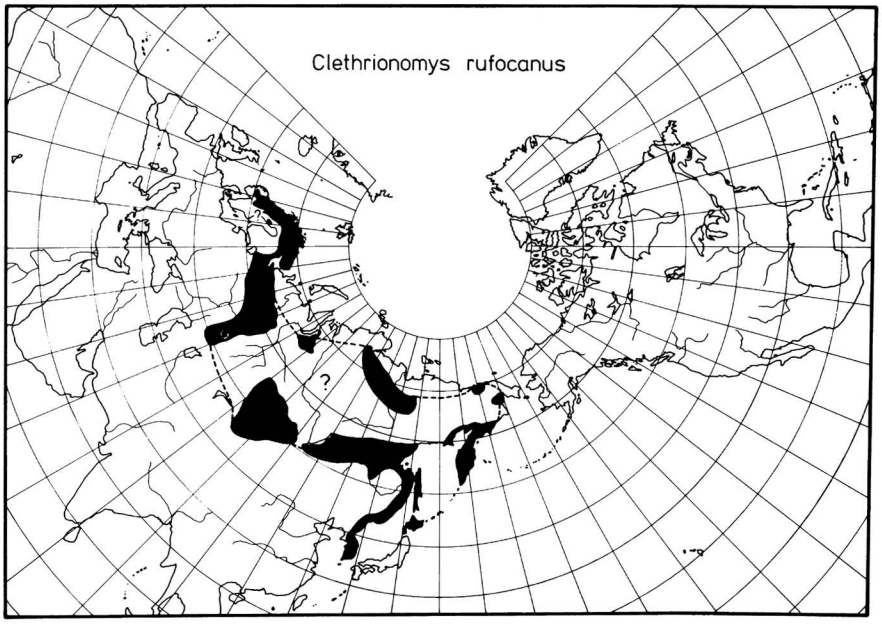

Fig. 3. Distribution of *Clethrionomys rufocanus*. Based on Map 45 in Corbet (1978:242), Map 106 in Bobrinskij et al. (1965), Map 57 in Niethammer & Krapp (1982) and on Honacki et al. (1982) and Hansson (1974).

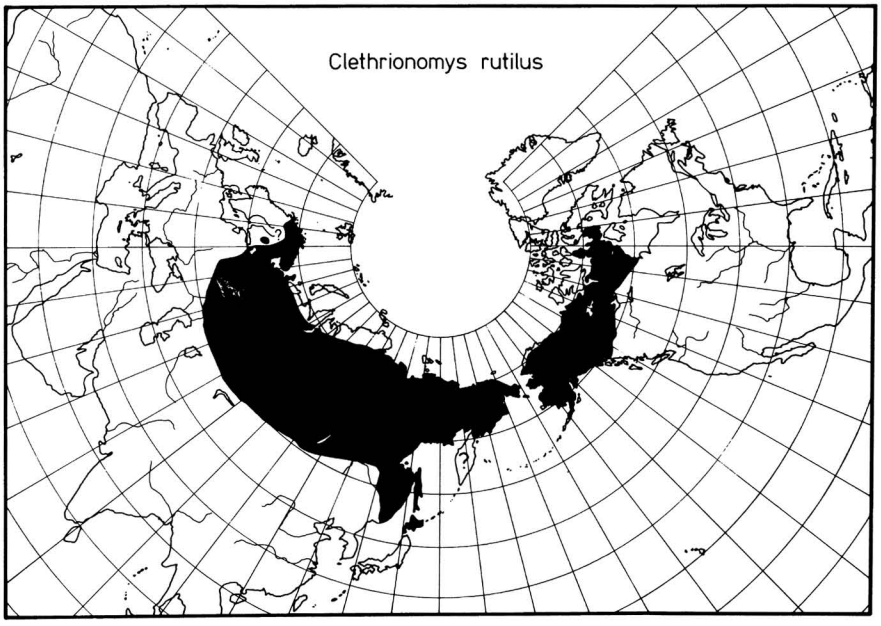

Fig. 4. Distribution of *Clethrionomys rutilus*. Based on Map 445 in Hall (1981:779), Map 46 in Corbet (1978), Map 106 in Bobrinskij et al. (1965), Map 64 in Niethammer & Krapp (1982) and on Honacki et al. (1982).

Table 1. *Clethrionomys* species of the world. Primarily based on Corbet (1978), Hall (1981) and Honacki et al. (1982) with respect to taxonomy and geographic distribution; and on Henttonen et al. (1985) with respect to population dynamical patterns. Other sources given as footnotes.

C. andersoni (Thomas, 1905), Japanese red-backed vole
Geographic distribution: N Honshu, Japan.
Population dynamical pattern: Unknown.
Taxonomical comments: *C. andersoni* according to Corbet 1978; *Eothenomys andersoni* according to Honacki et al. 1982:480, 485.

C. californicus (Merriam, 1890), California red-backed vole
Geographic distribution: Pacific coast coniferous forest from the Columbia River south through W. Oregon & N California.
Population dynamical pattern: Unknown.
Taxonomical comments: *C. occidentalis* was formerly used; populations north of Columbia River are placed in *C. gapperi*.

C. centralis (Miller, 1906)
Geographic distribution: Restricted to Tien Shan & Dzhungarsk, Altai Mtns (USSR & Sinkiang, China).
Population dynamical pattern: Unknown.
Taxonomical comments: Referred to in USSR as *C. frater* in current literature. Sometimes *C. centralis* is considered a synonym of *C. glareolus*.

C. gapperi (Vigors, 1830), Gapper's red-backed vole
Geographic distribution: Nearctic. From Labrador to N British Columbia (Canada), south in the Appalachians to N Georgia; Great Lakes, Northern Plains, and Rocky Mtns (New Mexico & Arizona) to Columbia River in Washington (USA) (see Fig. 1).
Population dynamical pattern: Non-cyclic throughout its range[1, 2, 3].
Taxonomical comments: Includes *C. occidentalis* & *C. caurinus*; closely related to European *C. glareolus* — captive matings produced fertile hybrids but of reduced fertility[4].

C. glareolus (Schreber, 1780), Bank vole
Geographic distribution: Palearctic. W Eurasia, from Britain and Scandinavia south to Pyrénées, Italy, the Balkans, Transcaucasus, and east to C Siberia (Altai and Sayan Mtns, USSR) (see Fig. 2). Populations on exceptionally high altitude are found in S Norway[9], at 1400 m a.s.l. and in the French Alps [10] at 2400 m a.s.l.
Population dynamical pattern: Both stable and cyclic populations[3, 5].
Taxonomical comments: See *C. gapperi* and *C. centralis*.

C. rufocanus (Sundvall, 1846), Grey-sided bank vole
Geographic distribution: Palearctic. N Palearctic from Scandinavia to Chukothka and Mongolia, Transbaikalia, NE China; Korea; Kamchatka, Sakhalin (USSR), Hokkaido & Rishiri Isl. (Japan) (see Fig. 3).
Population dynamical pattern: Cyclic populations (unknown whether stable populations exist).
Taxonomical comments: Includes *C. bedfordiae, C. monnatus* and *C. rex*; one or more separate species may occur in Japan, Korea & China (according to Honacki et al. 1982); includes *C. sikotanensis* according to Corbet 1978.

C. rutilus (Pallas, 1778), Northern red-backed vole
Geographic distribution: Holarctic. N. Scandinavia east to Chukotka, south to N Kazakhstan (USSR), Mongolia, Transbaikalia, NE China, Sakhalin and Hokkaido; St. Lawrence Isl. (Bering Sea); Alaska east to Hudson Bay, south to N British Columbia and Manitoba (Canada) (see Fig. 4).
Population dynamical pattern: Cyclic populations in, at least, Fennoscandia[2, 3, 6] and non-cyclic, stable populations in Asia, N America[2, 3, 6, 7] and W Norway[8].
Taxonomical comments: *C. rutilus* and *C. gapperi* are sometimes considered conspecifics.

1) Merritt 1981; 2) Henttonen & Hansson 1985a; 3) Henttonen et al. 1985; 4) Grant 1974; 5) Hansson 1979; 6) Henttonen & Hansson 1985b; 7) Whitney 1977; 8) Hansson et al. 1978 (the Västerålen site); 9) Skar et al. 1971; 10) Niethammer & Krapp 1982.

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