**"Jack."** 1878. Game bag and gun. Forest and Stream and Rod and Gun 11: 409.
**Jefferys, T.** 1760. The natural and civil history of the French Dominion in North America. Part 1. London. p. 39.
**King, W. R.** 1866. The sportsman and naturalist in Canada. Hurst and Blackett, London, 334 pp.
**LaHontan, B.** 1703. New voyages to North America. London. Volume 1. pp. 83–99.
**Lalement, J.** 1641. Jesuit relations and allied documents. *Edited by* R. G. Thwaites. Imperial Press, Cleveland. Chapter 21. p. 197.
**Leopold, A.** 1931. Game survey of the north central states. Madison.
**Magrath, T. W.** 1833. Authentic letters from Upper Canada; with an account of Canadian field sports. *Edited by* T. Radcliffe. (Reprinted McMillan, Toronto, 1967.) p. 181.
**McIlwraith, T.** 1886. Birds of Ontario. Hamilton Association, Hamilton. p. 130.
**Morden, J. A.** and **W. E. Saunders.** 1882. List of the birds of western Ontario. Canadian Sportsman and Naturalist 2: 192.
**Orr, J. E.** 1909. Some old time reminiscences of old Ontario. Rod and Gun in Canada 11: 524–526.
**Orr, J. E.** 1910. Some old time reminiscences of old Ontario. Rod and Gun in Canada 11: 1048–1052.
**Sagard, G.** 1632. The long journey to the country of the Hurons. Champlain Society, Toronto. (Reprinted 1939.) p. 220.
**Small, H. B.** 1866. The Canadian handbook and tourists guide. Longmoore and Co., Montreal. p. 169.
**Talbot, E. A.** 1824. Five years residence in the Canadas. Volume 1. Royal Ontario Museum records. p. 229.
**Wintemberg, W. J.** 1935. Archeological evidence of the presence of the Wild Turkey in Simcoe County, Ontario. Canadian Field-Naturalist 49: 125.
**Wright, A. H.** 1915. Early records of the Wild Turkey. III. Auk 32: 61–63.

R. M. ALISON

Ontario Ministry of Natural Resources, Wildlife Branch, Whitney Block, Queen's Park Crescent, Toronto, Ontario M7A 1W3

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# Are There Two Species of Pygmy Shrews (*Microsorex*)?

In his recent taxonomic revision of the genus *Microsorex*, Long (1972) tentatively listed two living species, *M. hoyi* and *M. thompsoni*. The latter is said to differ from *M. hoyi* in being smaller, in having a short skull (cranial length usually $< 15.6$ mm), minute teeth, a flattened cranium (the ratio of cranial breadth to depth in "old adults" usually being about 1.7), and in being more grayish in color (Long 1972, 1974). Long (1972) stated, without presenting evidence to support his claim, that the two forms are readily distinguishable in two areas of parapatry, southern Wisconsin and the Gaspé Peninsula.

In Canada, populations of *Microsorex* east of the St. Lawrence, except those of the Gaspé Peninsula, are referred to *M. thompsoni*; those of the rest of the country to *M. hoyi* (for further details on distribution see Long 1972). While reviewing *Microsorex* from Canada in the collection of the National Museum of Natural Sciences, I had an opportunity to evaluate Long's diagnostic characters using data provided in his paper (Long 1972) as well as data derived from our own specimens.

The coefficient of difference, C.D., (Mayr 1969) calculated for the skull lengths of the two forms given by Long (1972), using appropriate weighting (Simpson et al. 1960) where sample means were used in the calculation of the species means, is 0.588. This value corresponds to a non-overlap $< 75\%$ and a probability of misidentification (Lubischew 1962) $> 0.25$. Condylobasal lengths of eight *M. thompsoni* from Nova Scotia and New Brunswick and 27 *M. hoyi* from the rest of Canada (Table 1) show a non-overlap of 89% and a probability of misidentification of 0.11.

A comparison of the means for the length of the unicuspid series and the length of $P^4$ (Table 1) showed no significant difference in the former and a significant difference ($P = 0.02$) for the latter. The overlap in the length of $P^4$ is, however, considerable ($>50\%$). When length of $P^4$ was plotted against condylobasal length, observations for the two forms were found to cluster along a common trend line with an estimated slope of 0.04, strongly suggesting a negative allometric relationship between these two variates. Large animals, therefore, tend to have a relatively smaller $P^4$ than small ones. The difference in the size of the teeth of *M. thompsoni* and *M. hoyi* appears to be the result of the difference in overall size, with the smaller *M. thompsoni* having comparatively larger teeth relative to condylobasal length than the generally larger *M. hoyi*.

The covariation of cranial breadth and depth, including data from Long (1972), is depicted in Figure

TABLE 1—Comparison of three cranial variates (in millimetres) of *Microsorex* from New Brunswick and Nova Scotia (1) and the rest of Canada (2)

| Cranial variates | Sample size | Mean | Standard deviation | Coefficient of variability | Observed range |
|---|---|---|---|---|---|
| Condylobasal length | (1) 8 | 14.03 | 0.197 | 1.40 | 13.6–14.2 |
| | (2) 27 | 14.79 | 0.423 | 2.85 | 13.7–15.8 |
| Length of unicuspids | (1) 11 | 1.39 | 0.094 | 6.78 | 1.25–1.50 |
| | (2) 19 | 1.39 | 0.130 | 9.38 | 1.05–1.55 |
| Length of $P^4$ | (1) 11 | 1.10 | 0.070 | 6.36 | 1.00–1.25 |
| | (2) 20 | 1.15 | 0.063 | 5.46 | 1.05–1.25 |

1. We see that the observations of *M. thompsoni* lie entirely within the 95% equal frequency ellipse for *M. hoyi*. The observations for *M. thompsoni* are, with one exception, thoroughly interspersed among those of *M. hoyi* and the means for each of the subspecies show similar deviations from the major axis. It is obvious from the graphic comparison in Figure 1 that the ratio of cranial breadth to depth does not separate the two forms. To the contrary, the covariation of the two cranial variates suggests no difference between the two forms other than that of size.

As to color, specimens from the Maritimes could not be separated from specimens from other localities in eastern Canada, including the Gaspé, on the basis

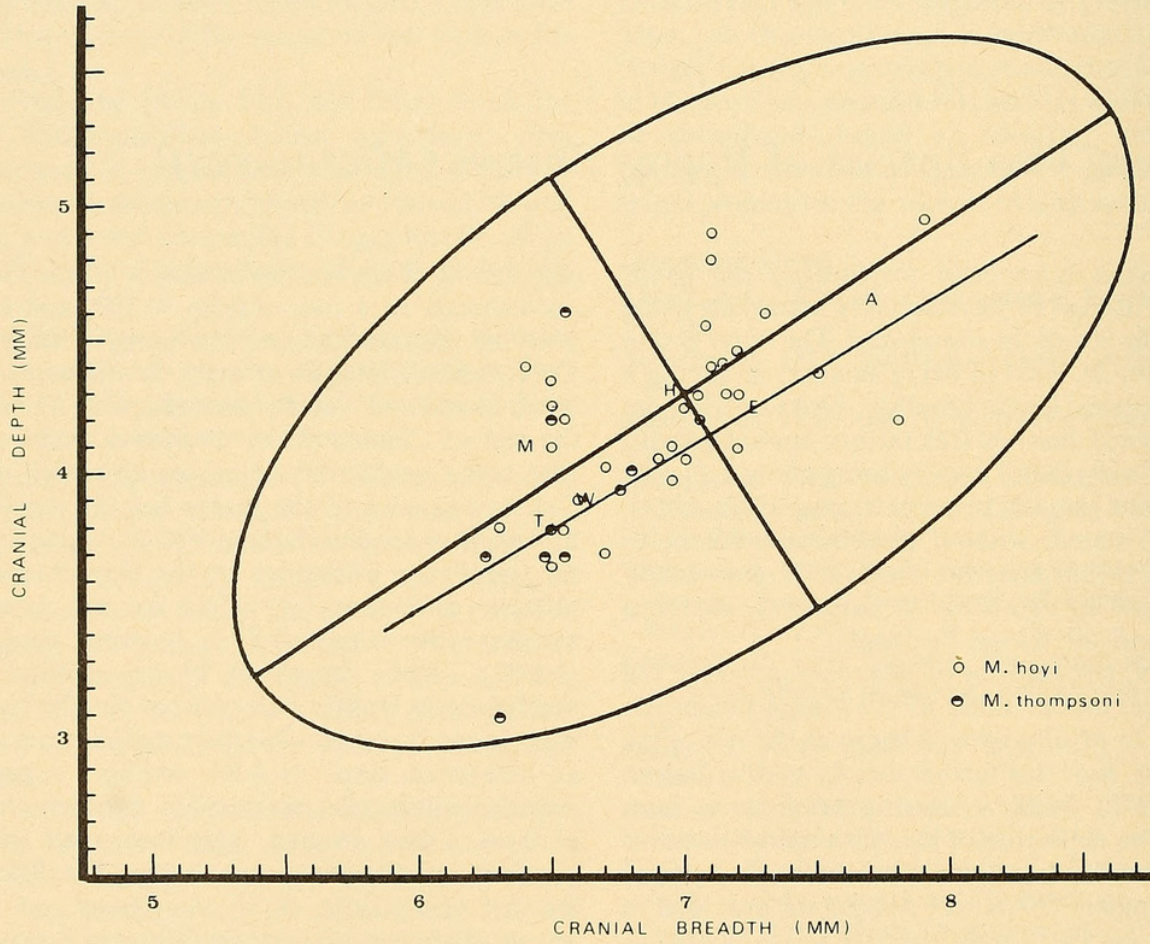


FIGURE 1. Covariation of cranial depth and cranial breadth in *M. hoyi* and *M. thompsoni*. The ellipse represents the bivariate distribution of *M. hoyi*. It encloses an area in which 95% of all observations for *M. hoyi* are expected to lie. The slope of the major axis $b = 0.666$, the correlation coefficient between the variates $r = 0.602$. Bivariate means for the different subspecies shown based in part on Long (1972), are as follows: A = *alnorum*; E = *eximius*; H = *hoyi*; M = *montanus*; W = *washingtoni*; T = *thompsoni*. The line below the major axis represents the 1.7 cranial breadth to depth ratio, or its reciprocal (0.58), claimed to characterize *M. thompsoni* by Long (1972).

of color by three persons asked to do so.

Of all diagnostic characters listed by Long (1972) only size appears to be of any use in separating the two forms. The difference in size between *M. hoyi* and *M. thompsoni* is, however, no greater than that found between many subspecies. The non-overlap for condylobasal length falls just below the conventional level of subspecific difference (Mayr 1969). Available evidence indicates a general tendency for southern forms to be smaller than northern forms in this genus (Long 1972), and it seems probable that animals from critical areas of contact between the two forms will prove to be intermediate in size.

As the degree of difference between the two forms is no greater than that between intergrading subspecies, it would be preferable, on the basis of the present evidence, to treat *M. thompsoni* as a subspecies of *M. hoyi*.

**Literature Cited**

**Long, C. A.** 1972. Taxonomic revision of the mammalian Genus *Microsorex* Coues. Transactions of the Kansas Academy of Science 74(2): 181–196.

**Long, C. A.** 1974. *Microsorex hoyi* and *Microsorex thompsoni*. Mammalian Species Number 33. 4 pp.

**Lubischew, A. A.** 1962. On the use of discriminant functions in taxonomy. Biometrics 18(1–4): 455–477.

**Mayr, E.** 1969. Principles of systematic zoology. McGraw-Hill Book Co., New York. 428 pp.

**Simpson, G. G., A. Roe,** and **R. C. Lewontin.** 1960. Quantitative zoology. Harcourt, Brace and Co., New York. 440 pp.

C. G. VAN ZYLL DE JONG

National Museum of Natural Sciences, Ottawa, Ontario K1A 0M8

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# Breeding of the Marbled Godwit, *Limosa fedoa*, in James Bay

Although the Marbled Godwit (*Limosa fedoa*) has been observed regularly on the west coast of James Bay for many years, definite proof that it may breed there has not been forthcoming. This note reports the first breeding record of the species from James Bay and discusses its status there. The nearest previously known breeding areas were some 900 km to the southwest on the grasslands of the Canadian prairies (central and southern Manitoba) and south into central Montana, the Dakotas, and west-central Minnesota (AOU 1957; Godfrey 1966).

Records of the Marbled Godwit in James Bay date back to 1860, when Drexler saw and collected a bird at or near Moose Factory (Preble 1902; Todd 1963). Locations of records mentioned in the text are marked in Figure 1. Spreadborough, who visted James Bay in 1896 and 1904, stated that the species bred on both coasts (Macoun and Macoun 1909), but no evidence was advanced in support of this statement. Subsequent sight and specimen records have confirmed the regular occurrence of the Marbled Godwit on the west and south coasts. Todd (1943, 1963) described finding over a dozen birds at the mouth of the Mississicabi River in Hannah Bay on 24 and 25 June 1941. Five specimens were collected, but dissection indicated that the birds were not in breeding condition. In 1947, Manning (1952) collected the male of an apparent pair near North Point on 3 June, and another male on the south coast of Akimiski Island on 23 June. No notes were made on the behavior of the birds or their breeding condition, though neither specimen (in the National Museum of Natural Sciences, Ottawa) has any obvious incubation patch. The testes measured 14 mm and 10 mm, respectively. Other records from the southern part of James Bay include the following: one at the mouth of the Harricanaw River on 15 June 1926, and seven at East Point on 16 June 1926 by G. M. Sutton (Todd 1963); 10 on Ship Sands Island on 15 June 1943 (R. H. Smith, unpublished manuscript); and a bird behaving as though it had a nest or young nearby on Ship Sands Island, 24–30 June 1968 (R. S. Brodey, letter to the National Museum of Natural Sciences, Ottawa).

The most extensive records indicating probable breeding of the Marbled Godwit in the James Bay area were obtained by Hagar (unpublished notes), who visited the west coast of the bay and the northwest and southwest coasts of Akimiski Island in 1966. The possibility of the Marbled Godwit breeding on Akimiski Island was first suggested by conversations with John Buckalew, who had seen Hudsonian and Marbled Godwits there while banding geese in 1957. On 9–10 July 1966, Hagar saw numerous Marbled Godwits, mostly in groups of two to six at Branch Creek, 8 km north of the North Channel of the Albany River on the west coast of James Bay. A single bird was also seen 6 km south of the Kapiskau River on 10 July. Between 14 and 18 July, large