Comparison of the Tarsal Widths of Song Sparrows and Puget Sound White-crowned Sparrows: The Use of Band Size 1

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ABSTRACT

The results of this study show band size 1 fits Puget Sound White-crowned Sparrows (*Zonotrichia leucophrys pugetensis*) in southwest British Columbia and this band size could be considered as an alternate size for this subspecies. Tarsal widths of Song Sparrows (*Melospiza melodia*) and Puget Sound White-crowned Sparrows are very similar in southwest British Columbia.

INTRODUCTION

Band size 1B is currently the only recommended band size option accepted by banding authorities in North America for Puget Sound White-crowned Sparrows (Canadian Wildlife Service and U. S. Fish and Wildlife Service 1991, Pyle 1997). The recommended size for Song Sparrows is 1B, but there is an alternate band size of 1 which can be used (Canadian Wildlife Service and U. S. Fish and Wildlife Service 1991). I noticed through casual observations that the two species' tarsal dimensions were very closely related. It is the intent of this paper to show that the tarsi of the Puget Sound White-crowned Sparrow are almost identical in size to the Song Sparrow, and thus a size 1 band may be used as an alternate band choice for the Puget Sound White-crowned Sparrow.

METHODS

A comparison of the tarsal widths of Puget Sound White-crowned Sparrow and Song Sparrow (*M. m. morphna*) was conducted with hatch year (HY) and after-hatch-year (AHY) birds. In the fall of 1998 I banded 110 of each species at the Iona Island banding station in Richmond, British Columbia. Birds were captured using standard mist netting techniques. The tarsal widths were measured using methodology as described in Michalak (1997). By using a set of digital calipers, the anterior-posterior tarsal width (APTW) and the lateral tarsal width (LTW) of both species were recorded. Only the APTW measurements were used in the analysis because the APTW are the larger of the two measurements and determine the size of band that a bird can wear. They are considerably larger than the LTW, which do not influence the band size used on passerines. The APTW measurements of the two age groups: (HY and AHY) were treated as the same because size variation in the two ages was negligible at this time of year. APTW of the Puget Sound White-crowned Sparrow was compared to the APTW of the Song Sparrow population using a two-tailed F-test (measure of variances) and a t-test (measure of mean similarity) to see if there was a large statistical difference in tarsal widths of the two populations.

RESULTS AND DISCUSSION

One hundred and ten Puget Sound White-crowned Sparrows (all HY), and 110 Song Sparrows (5 AHY and 105 HY) tarsi were measured between September and October 1998. Puget Sound White-crowned Sparrows measured had an APTW range of 1.29 mm to 2.32 mm, a difference of 1.03 mm (Figure 1) and the Song Sparrows had an APTW range of 1.85 mm to 2.35 mm, a difference of 0.50 mm (Figure 2). I found that APTW of Puget Sound White-crowned Sparrows were much more variable than those of Song Sparrows, a difference of 0.53 mm. This may be attributed to the characteristics of the subspecies or to sample error, but both species exhibited an example of a natural distribution in populations (Figures 1 and 2).

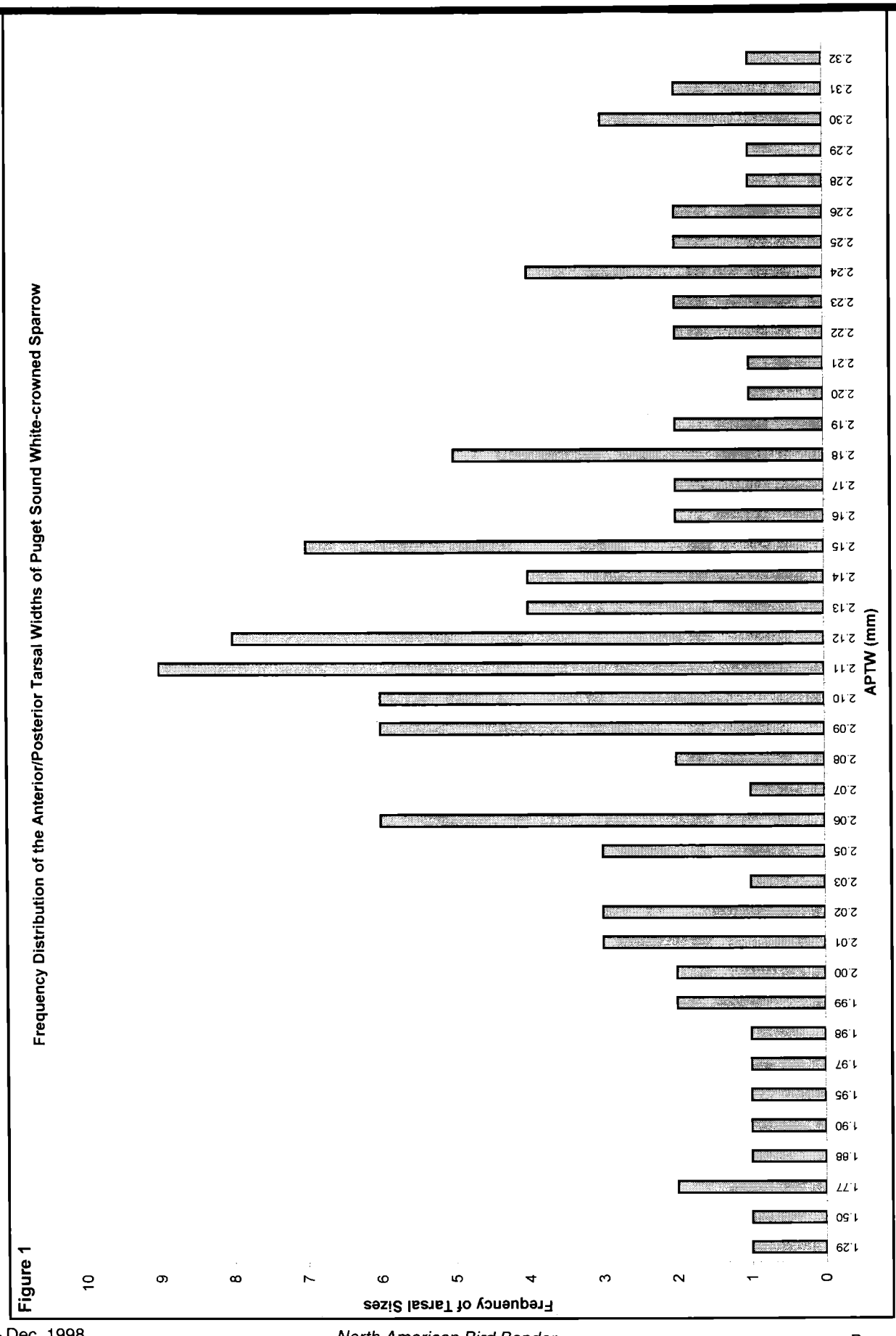
Frequency Distribution of the Anterior/Posterior Tarsal Widths of Puget Sound White-crowned Sparrow
Frequency of Tarsal Sizes
0
1
2
3
4
5
6
7
8
9
10
APTW (mm)
1.29
1.50
1.77
1.88
1.90
1.95
1.97
1.98
1.99
2.00
2.01
2.02
2.03
2.05
2.06
2.07
2.08
2.09
2.10
2.11
2.12
2.13
2.14
2.15
2.16
2.17
2.18
2.19
2.20
2.21
2.22
2.23
2.24
2.25
2.26
2.28
2.29
2.30
2.31
2.32

Figure 1

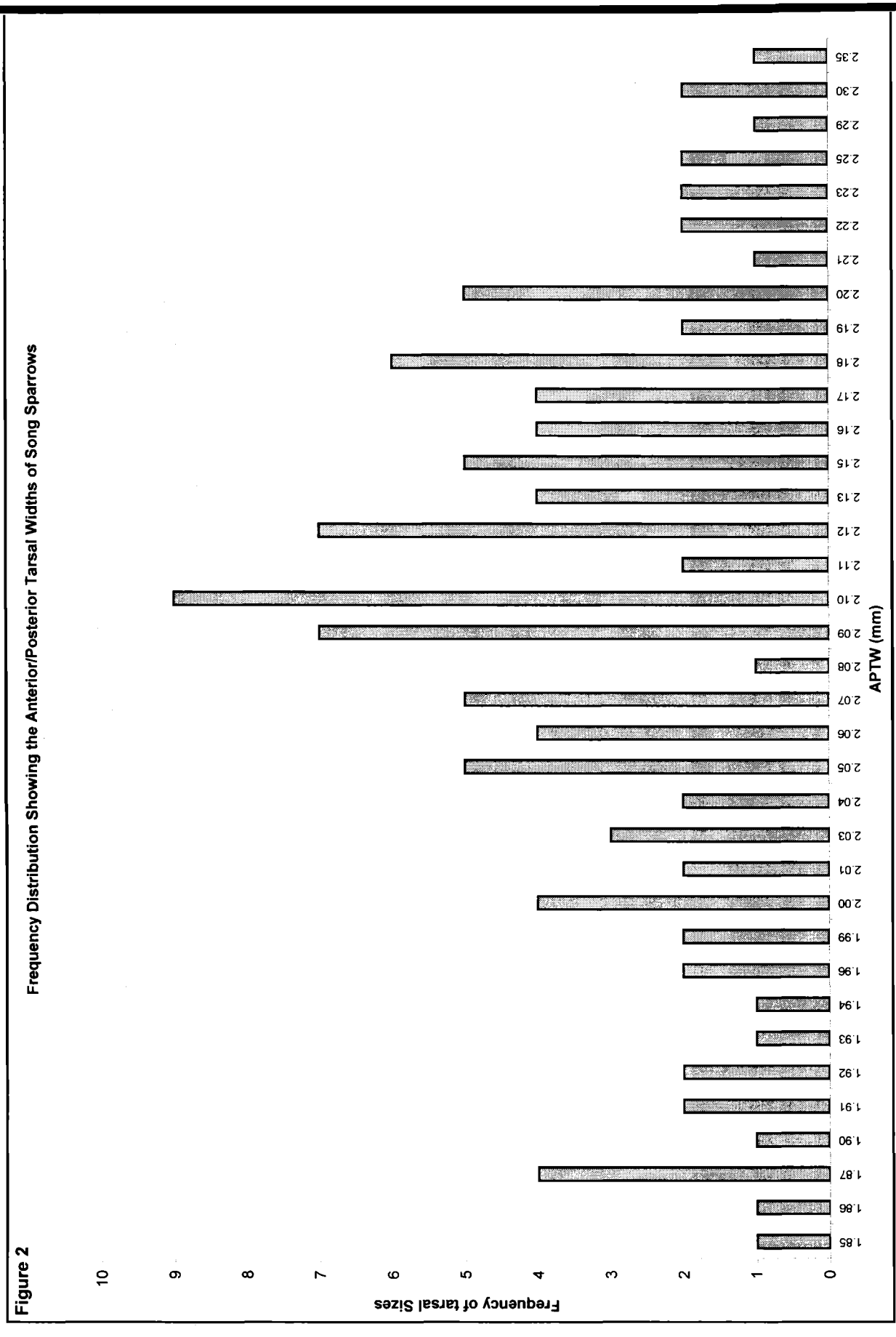
Frequency Distribution Showing the Anterior/Posterior Tarsal Widths of Song Sparrows
Frequency of tarsal Sizes
0
1
2
3
4
5
6
7
8
9
10
APTW (mm)
1.85
1.86
1.87
1.90
1.91
1.92
1.93
1.94
1.96
1.99
2.00
2.01
2.03
2.04
2.05
2.06
2.07
2.08
2.09
2.10
2.11
2.12
2.13
2.15
2.16
2.17
2.18
2.19
2.20
2.21
2.22
2.23
2.25
2.29
2.30
2.35

Figure 2

The size 1 band has an internal diameter of 2.38 mm and a height of 5.5 mm (Canadian Wildlife Service and U.S. Fish and Wildlife Service 1991). The Song Sparrow has this band size prescribed as a secondary option, while the primary recommended size for use on this species is 1B.

Largest APTW for Song Sparrows was 2.35 mm. This leaves a margin of play of 0.03 mm in the size 1 band. Average APTW was 2.09 mm (Figure 2), and a standard deviation of 0.10 mm. This allows a difference of 1.99 mm to 2.19 mm tarsal size, thus leaving 0.39 mm to 0.19 mm ring play on the tarsi of Song Sparrows. Sample error for the population at $P = 0.01$ was ±0.03 mm (2.06-2.12 mm).

The largest Puget Sound White-crowned Sparrow APTW was 2.32 mm and the smallest was 1.29 mm. The largest tarsal width recorded leaves 0.06 mm of play in the size 1 band. Average APTW was 2.12 mm (Figure 1). The standard deviation was 0.14 mm, a difference of 1.98 mm to 2.26 mm in tarsal width. This leaves 0.40 mm to 0.12 mm ring play on the tarsi of Puget Sound White-crowned Sparrows in the sample population and a sampling error at $P = 0.01$ of ±0.04 mm (2.08-2.16 mm).

An F-test was performed on the two populations to see if the variances were closely related. A score of F=0.0013 at $P = 0.01$ indicated almost no difference in tarsi variance among the populations. A t-test was performed to see if the means of the two populations were similar. The score was $t = 0.367$ at $P = 0.01$. There seems to be a very close relationship among the means even with the margin of error taken into account. There appears to be almost no difference in the APTW measurements of the two populations as can be seen in Figures 1 and 2.

From this experiment it may be concluded that the Puget Sound White-crowned Sparrow has a very similar APTW to the Song Sparrow.

All birds in this experiment were banded with a size 1 band and only 11 individuals were recaptured because of the movement of birds at this season. None of the retraps appeared to be hindered in any way by the size 1 band— no abrasions, excessive wear, dirt deposit or cuts were noticed.

The size 1 band appears to be an acceptable choice to use as an alternate size on the Puget Sound White-crowned Sparrow.

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