COMPARISON OF TWO INSTRUMENTS FOR MEASURING FIBER CHARACTERISTICS OF WOOL



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Introduction

Two instruments were compared for measuring fiber characteristics of wool using the OFDA 100 (BSC Electronics, Ardross, W. Australia) and the OFDA2000. The OFDA 100 is approved in the standard method and used under standard atmospheric conditions (65% RH and 21°C) to measure average fiber diameter (AFD) and variability (SDFD and CVSD) of scoured wool (2 mm) snippets and can also measure other important wool traits such as comfort factor (CF), average fiber curvature (AFC) and variability (SDFC and CVFC), respectively. The OFDA2000 measures greasy staples and is a portable, computerized instrument designed for onfarm use with essentially the same capabilities as the OFDA 100 with the exception of being able to operate under non-atmospheric conditions (i.e., corrections are made electronically for RH and temperature). It measures the same traits as the OFDA 100 plus staple length. A retrofitted add-on also permits the OFDA2000 to measure cleaned snippets mounted on glass slides in a similar manner to the OFDA 100.



Figure 1. OFDA 100.

Experimental Procedure

Two sets of greasy wool staples were assembled ($n_1 = 108$, AFD = 22.8, range = 18.7-27.6 µm, $n_2 = 107$, AFD = 25.7, range = 19.0-31.0 µm) having been shorn from rapidly growing yearling Rambouillet rams. The greasy staples were first measured using the OFDA2000. The staples were

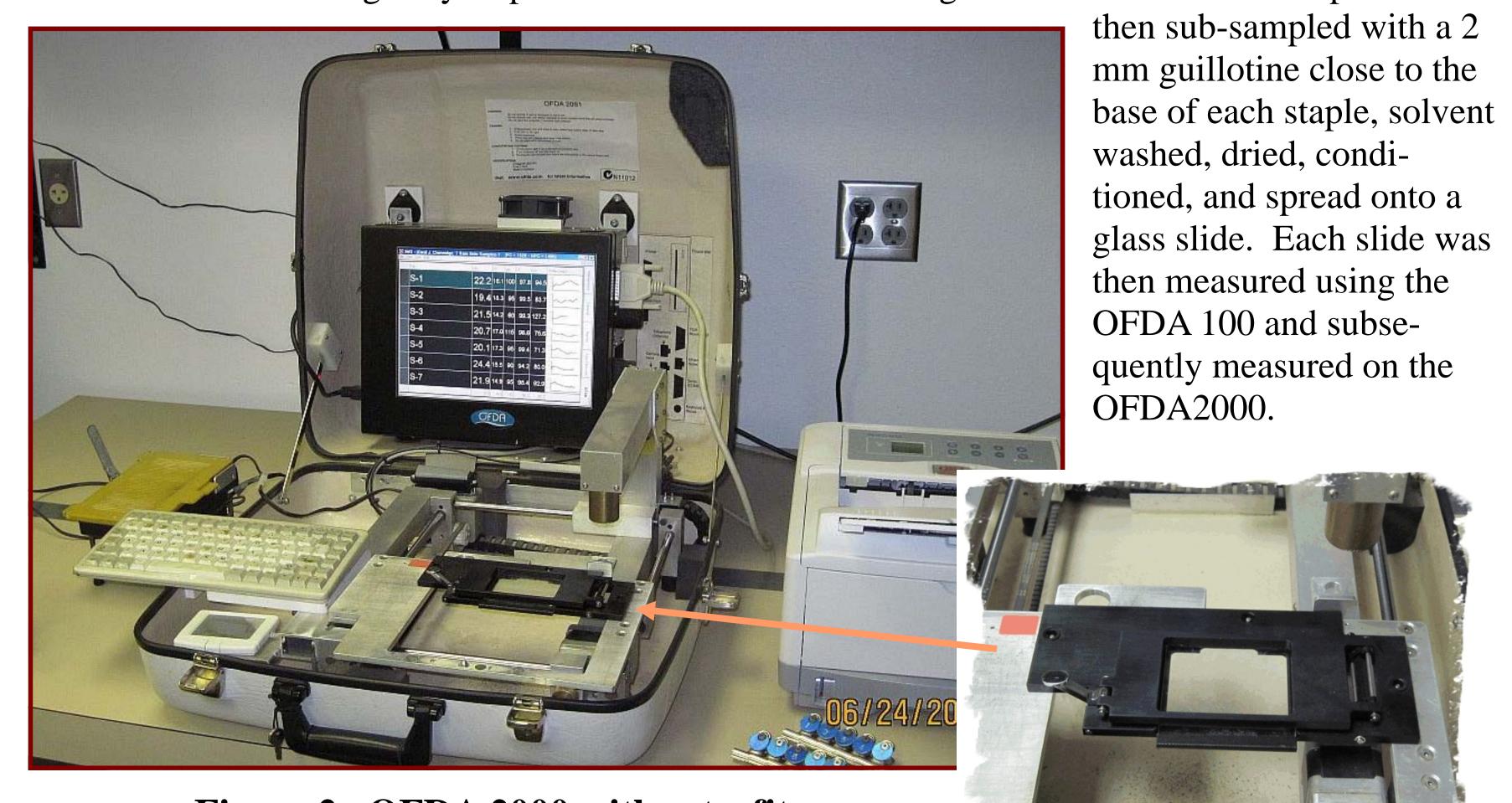


Figure 2. OFDA 2000 with retrofit.

Results

The data were analyzed using the paired T-test, and CORR procedures of SAS. Results for staple sets 1 and 2 are presented in Tables 1 and 2, respectively. Average snippet AFD was not different between instruments in set 1 (P=0.11) though a small difference was observed for set 2 (Δ AFD = 0.11 μ m, SED = 0.02 μ m , P<0.01). All other snippet traits were different in set 1 (Table 1). All snippet traits in set 2 were different with the exception of CVFC (Table 2). Staple samples from young, rapidly growing, finewool rams are typically coarser at the base than at the tip. Thus the observed differences between the OFDA2000 staple measurements of AFD (21.57 and 23.73 μ m for sets 1 and 2, respectively) and the snippet (base of staple) measurements (22.78 and 25.57 μ m) are expected. Most traits measured on staples with the OFDA2000 were different than those same traits measured on snippets.

Table 1. Means and r-values for wool characteristics of side samples measured with 2 instruments.

Item	1,OFDA/ 100 snippet	2,OFDA/ 2000 staple	3,OFDA/ 2000 snippet	r, 1 vs 2	r, 1 vs 3	r, 2 vs 3
AFD, μm	22.80 ^a	21.57 ^b	22.78 ^a	0.882	0.995	0.865
SDFD, µm	3.87 ^a	3.58 ^c	3.77 ^b	0.867	0.964	0.887
CVFD, %	16.96 ^a	16.54 ^b	16.55 ^b	0.811	0.949	0.830
CF, %	95.81 ^c	97.70 ^a	96.14 ^b	0.858	0.964	0.890
AFC,º/mm	100.05 ^a	86.19 ^c	97.80 ^b	0.768	0.973	0.756
SDFC,°/mm	57.67 ^a	58.45 ^a	55.81 ^b	0.650	0.934	0.626
CVFC,º/mm	57.75 ^b	68.03 ^a	57.18 ^c	0.256	0.815	0.226

^{a,b,c} Within a row, means without common superscripts differ (P < 0.01).

Table 2. Means and r-values for wool characteristics of britch samples measured with 2 instruments.

Item	1,OFDA/ 100 snippet	2,OFDA/ 2000 staple	3,OFDA 2000 snippet	r, 1 vs 2	r, 1 vs 3	r, 2 vs 3
AFD, μm	25.68 ^a	23.73 ^c	25.57 ^b	0.886	0.995	0.876
SDFD, µm	4.68 ^a	4.25 ^c	4.58 ^b	0.882	0.992	0.838
CVFD, %	18.19 ^a	17.88 ^{a,b}	17.89 ^b	0.763	0.984	0.776
CF, %	84.62 ^c	91.78 ^a	85.32 ^b	0.913	0.993	0.915
AFC,º/mm	73.22 ^a	67.59 ^c	71.50 ^b	0.651	0.980	0.641
SDFC,°/mm	45.54 ^a	45.77 ^a	44.03 ^b	0.642	0.818	0.528
CVFC,º/mm	62.22 ^b	67.85 ^a	61.68 ^b	0.223	0.437	0.226

^{a,b,c} Within a row, means without common superscripts differ (P < 0.01).

Conclusions

Greasy staples measured on the OFDA2000 result in useful measurements for selection purposes but caution should be used when comparing measurements with the washed snippet samples of the OFDA 100 and the OFDA2000 particularly when the snippets are cut at the base of the staple (versus mini-coring the whole staple, for example). Though very highly correlated, small differences were present between most snippet measurements made with the two instruments, the two exceptions being AFD measurements with the finer set of samples and CVFC in the coarser set. For most practical purposes (e.g. selection of sheep based on wool traits) results from the 2 instruments could be used interchangeably.

