discover why some wheats are higher in protein than others. These data were obtained in 1954, but they are still valid, and may be of interest and value to workers investigating the problems of wheat protein.

Procedure

Spring wheat varieties 'Supreme,' 'Rescue,' and 'Lee' were evaluated from standard yield nursery plantings under irrigation at Bozeman and Creston and on dryland at Havre, Huntley, Moccasin, and Creston, Montana in 1954. Data were obtained from four replications at each location except Creston where only three replications were available.

Twenty-five main spikes and 25 tiller spikes were selected at random from the border rows of each plot at harvest. Small, low spikes were taken to represent tiller spikes while the larger and taller spikes were taken to represent main spikes. Some of the main spikes were divided equally into top, middle and bottom thirds for grain protein analysis; others were separated by hand threshing the two lateral kernels of each spikelet and then threshing the rest of the spike.

Protein percentage comparisons (N × 5.7) were made on: (a) grain from main and tiller spikes; (b) central and lateral kernels; and (c) top, middle, and bottom spikelet kernels.

Results

Significant protein differences were obtained between locations and varieties for each of the comparisons made, as expected from previous observations.

Average protein of 14.98% for main spikes and 14.73% for tiller spikes were not significantly different. This agrees with results reported earlier. However, a significant protein × location interaction was obtained, indicating that tiller and main spike protein varied from location to location in their relation to one another. Under irrigation at Bozeman, main heads averaged 12.0% protein, and tiller heads only 10.4%, but on dryland at Moccasin they were 17.1% and 17.9%, respectively. The Moccasin percentages agree closely with the data of Levi and Anderson's Table II, where an average of the longest and shortest tillers gives 16.7 and 17.5% protein. Variations among locations might be due to differences in soil moisture and available nitrogen.

Central kernels averaged 14.85% protein and laterals averaged 14.71%; these differences were not significant. These values are average data from Lee and Supreme only, since insufficient seed was available from all plots of Rescue. No significant interactions were obtained, indicating

that neither locations nor varieties had an influence on protein content of central or lateral kernels.

Kernels from the top portion of the main spike contained 13.9% protein, and they were significantly lower than were kernels from the middle and bottom portions (Table 1). Protein X nitrogen interactions were not obtained, indicating that nitrogen availability and proper conditions for partition of protein from stems and leaves to grain growing season seem essential for maximum protein.

A PLANTER FOR SPACING ROWS IN FLATS

Eugene Dade

The planter for seeding rows in flats

Burton may be modified to provide an accurate spacing of seeds within the row. The unit described here was constructed to place 25 seeds 1/2-inch apart and may be used with seeds ranging in size from white clover to wheat. A row of 25 seeds can be planted in less than a minute with the planter.

Design of the planter (Fig. 1) is similar to the Burton planter, although construction details and materials differ. Wooden inserts, in which 1/4-inch-diameter holes with tapered ends have been drilled (Fig. 2), are attached to the metal sides. The depth gauge is adjustable.

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Fig. 1. Side view, showing details of construction.