Berseem Clover Seeding Rates and Row Spacings for Montana

These trials indicate that berseem clover should be seeded at 40 PLS or more per square foot, about 8 lbs/a.

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Improved seed quality and seed placement techniques have facilitated reduced seeding rates for many small-seeded crops. Soil-seed contact has been enhanced through improved seedbed preparation and planting methods. The manner of expressing seeding rates has also changed, from lbs/a to "pure live seed" per square foot (PLS/sq.ft.). For example, alfalfa seeding rates have been reduced from 15-20 lbs/a (70-90 seeds/ sq. ft.) to 20-35 PLS/sq. ft. (approx. 5-7 lbs/a). The published seeding rate for berseem clover is 15-20 lbs/a. Producers are currently seeding at lower rates. The purpose of this study was to determine the optimum seeding rate and row spacing for berseem clover forage production.

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Materials and Methods

Berseem clover seeding rate and row spacing trials were established on dryland sites near Bozeman and Moccasin, and on irrigated sites near Bozeman, Corvallis and Kalispell, Montana. The variety 'Bigbee' was seeded at 10, 20, 30, 40, and 50 PLS/sq. ft. in six, 12, and 24 inch spaced rows in early May 1988. Seeding depth was about one half inch. A hoe drill was used at Moccasin and a double-disk drill at the other locations. The trials at Bozeman, Corvallis, and Kalispell were established on fallow land. The Moccasin site was recropped on tilled barley stubble. Weeds were controlled by a preplant incorporation of 3.0 lbs ai/a EPTC. Phosphorus fertilizer was applied at 90 pounds P_2O_5 per acre preplant at Bozeman, and 60, 44, and 23 pounds P_2O_5 per acre with the seed at Corvallis, Kalispell and Moccasin, respectively. The phosphorus content of tested berseem clover samples was 0.25 - 0.30 percent.

Results and Discussion

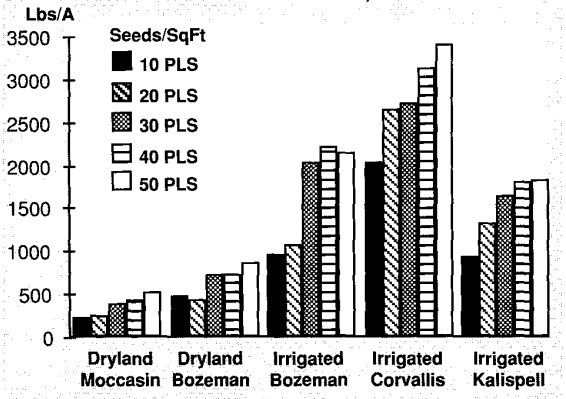
The Moccasin location received two inches of moisture in a wind-driven rain the day after seeding, followed by a day of 75°F temperatures and drying wind. The rain sloughed off the hoe drill furrow ridges burying the seed deeper than desired; and the extreme drying conditions caused severe crusting. Remedial measures, such as harrowing, were not feasible as further leveling of the furrow ridges would have buried the seed deeper. The 24 inch row spacing had better stand establishment. This may have been due to the higher density of seedlings pushing through the crusted surface. This demonstrates the importance of seeding depth and using the appropriate equipment when possible.

Seeding Rate. Berseem clover forage yields increased significantly (LSD 0.05) with increased seeding rates for the first harvest at all locations (Figure 1). Yields increased an average of 99 percent as seeding rate was increased from 10 PLS/sq.ft. to 50 PLS/sq.ft. across the three row spacings. The yield response tended to level off at higher seeding rates.

In two-cut systems, seeding rate did not significantly affect second cutting forage yields across the three row spacings (Figure 2). This indicates berseem clover has the ability to compensate for inter-row plant density. Even though seeding rate did not have a significant impact on second cutting yields, seeding rate did affect total forage yields in two-cut systems. The total forage yield for the 10 PLS/sq.ft. seeding rate was significantly lower than the total forage yield of the 30, 40, and 50 PLS/sq.ft. seeding rates for all two cut environments. Total forage yields of the 20, 30, 40, and 50 PLS/sq.ft. seeding rates for the Bozeman dryland and irrigated environments were similar and the total yields for the 30, 40, and 50 PLS/sq.ft. seeding rates for the Kalispell irrigated environment were similar, also.

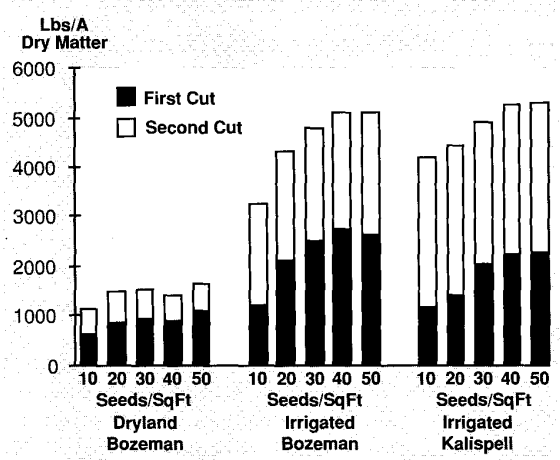
Row Spacing. Forage yields of berseem clover seeded in 24 inch spaced rows were lower than

Figure 1: Effect of Seeding Rate on Berseem Clover Single Harvest Forage Yields Under Five Montana Environments



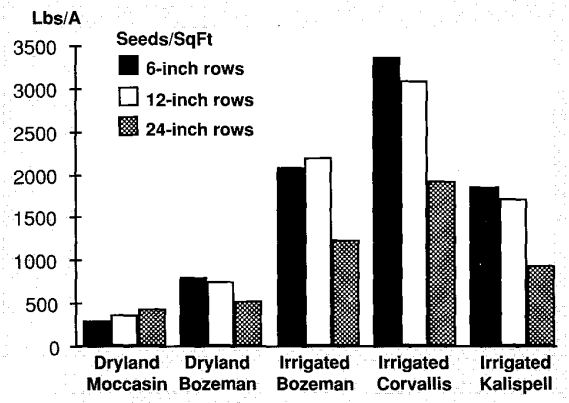
LSD 0.05 at Moccasin 163, Bozeman Dry 247, Bozeman Irrigated 448, Corvallis Irrigated 454 and Kalispell Irrigated 179.

Figure 2: Effect of Seeding Rate on Berseem Clover Yields in a Two-Cut System Under Five Montana Environments



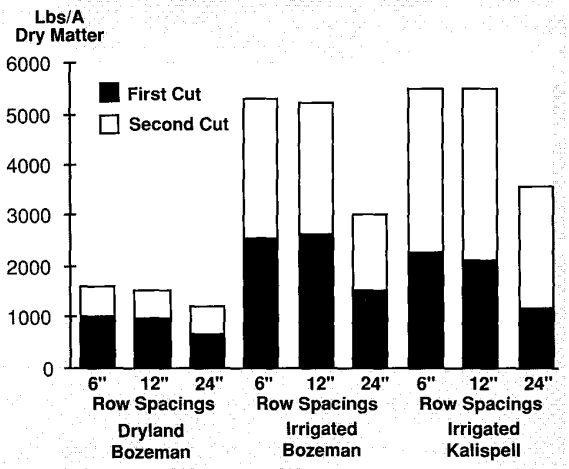
LSD 0.05 for first cuts at Bozeman Dry 247, Bozeman Irrigated 448, and Kalispell Irrigated 224; for second cuts not significant; for total Bozeman Dry 561, Bozeman Irrigated 1210 and Kalispell Irrigated 717.

Figure 3: Effect of Row Spacing on Berseem Clover Single Harvest Forage Yields Under Five Montana Environments



LSD 0.05 at Moccasin 0, Bozeman Dry 202, Bozeman Irrigated 359, Corvallis Irrigated 454 and Kalispell Irrigated 179.

Figure 4: Effect of Row Spacing on Berseem Clover Yields in a Two-Cut System Under Five Montana Environments



LSD 0.05 for first cuts at Bozeman Dry 202, Bozeman Irrigated 359, and Kalispell Irrigated 179; for second cut Bozeman Dry no significant difference, for Bozeman Irrigated 381, and for Kalispell Irrigated 291; for total Bozeman Dry 247, Bozeman Irrigated1323, Kalispell Irrigated 851.

yields of the six and 12 inch rows for single harvest, second cutting, and total harvest at all locations except Moccasin (Figures 3 and 4). When the yield was reduced due to increasing row spacing from either six or 12 inches to 24 inches, the reduction was significant (LSD 0.05) for all cases except the second cutting at Bozeman. The six inch row spacing frequently produced higher yields than the 12 inch row spacing within a seeding rate, but the difference was rarely significant.

Seeding Rate x Row Spacing Interaction. There was no significant interaction between seeding rate and row spacing at any location.

Summary

These trials indicate that berseem clover should be seeded at 40 PLS or more per square foot (approx. 8 lbs/a). Row spacings should be 12 inches or less for maximum forage yields. As with all small-seed crops, proper seed-bed preparation and seed placement is critical. In these studies, the weeds were controlled by herbicides. In circumstances where the use of herbicides is not economical, seeding at higher rates and in narrower rows may improve berseem clover yields by inhibiting weed growth.