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## PEARL MILLET FOR GRAZING

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### SUMMARY

Pearl millet is generally more productive in the sandy soils area of the South than sorghums or sorghum x sudan crosses. Also, millet and other summer annuals are higher in energy content than most warm season perennials, and can support greater animal performance. In this study a hybrid pearl millet 'Millex 23' was seeded at 15 lbs per acre on a sandy loam bottom soil and fertilized with 100 lbs each of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O at seeding. Weaned crossbred calves were grazed at stocking rates varying from 1.5 to 4.5 animals per acre. Live weight gains per head per day (ADG) ranged from .60 to 2.23 pounds. Average daily gains increased as forage availability increased but appeared to peak at about two pounds of gain per animal per day.

Forage quality and animal gains declined through the season. Gains were negatively related to neutral detergent fiber (NDF) values of the forage. The correlation between ADG and NDF was  $r = -.84$ , which indicates that NDF of available forage is a reasonable index of animal gain.

### OBJECTIVES

The primary objectives of this study were to evaluate the effect of grazing pressures (stocking rate) on per animal and per acre performance from calves grazing pearl millet; and to determine the point of maximum profitability.

### PROCEDURES

A hybrid pearl millet, 'Millex 23' was seeded with a grain drill at the rate of 15 lbs/acre on a well prepared seedbed in mid-May (seeding was delayed 2 to 4 weeks due to availability of test animals). At planting, 100-100-100 lbs/acre of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O were applied and in mid-July another 65 lbs/acre of N was applied. Grazing by crossbred steers was continuous and began in late June. In order to achieve the desired forage availability levels, "grazers" (animals not used for gain data, but used to compute grazing days) were used for short durations. Hence, a "put and take" system of grazing was utilized to evaluate the millet.



Therefore, the stocking rate in this report is an average over the entire grazing period. Four tester calves per pasture weighing 525 lbs and about 270 days of age were utilized in the trial. All animals were weighed on 14 day intervals. Estimates of forage production and consumption were made at 28 day intervals by cage-difference technique. Forage samples for chemical analyses were taken on 14 day intervals.

### RESULTS

Average animal performance at three stocking rates and gain per acre is shown in table 1.

Table 1. Animal performance from pearl millet grazed at three stocking rates.

	Stocking Rate		
	High	Medium	Low
Animals/acre	4.5	3.3	2.2
Average daily gain, lb	.69	1.70	2.11
Gain/acre (90 days grazing)	279.00	505.00	418.00

These results follow the pattern of stocking rate studies with other grasses, i.e., as stocking rate (animals/acre) decreased the ADG increased. Maximum gain per acre (G/A) was greatest at the medium stocking rate. At the high stocking rate, the ADG and G/A declined and forage availability was reduced. When the stocking rate was reduced, forage availability increased and ADG increased. However, the increase in ADG only compensated for reduced animal numbers to a limited extent. Thus, at the lowest stocking rate (2.2 animals/acre) ADG was maximized, but G/A was lower than at the medium stocking rate.

As the grazing season progressed, gradual changes in forage quality occurred and this reduction in quality resulted in reduced gains even when forage availability was not limited.

Forage quality which can be measured by in vitro digestible dry matter (IVDDM), declined over the length of the grazing season. In these studies IVDDM was at a high of 60% at 58 days post planting. At 100 days post planting, the forage IVDDM had declined to 38%.

Although not illustrated here, ADG declined in a linear fashion as the grazing season progressed. The decline in ADG and the reduction in IVDDM resulted from loss of leaves due to selective grazing and increased age or maturity of the forage.



## Profitability of Grazing

The primary concern of the producer revolves around efficiency of utilization and profitability of grazing. Several factors influence the profitability of pearl millet as a grazing crop:

1.) The most important factor determining profit in a short duration grazing program is buying and selling price of the cattle. The positive or negative price differential between these two prices is more critical than any other factor and deserves all of the study necessary to minimize the amount of negative margin that may be experienced. In addition to market analysis, the producer may consider forward contracting, or hedging on the commodity market. The grazing season ends fairly abruptly with pearl millet and there is little latitude to wait for market improvement, and normally there are no other forages available to the producer when the millet grazing season ends.

2.) Stocking rate is the primary determinant of profit after price. In general, very high stocking rates (overgrazing) reduces animal ADG and per acre gain. In contrast, low stocking rates (forage of unlimited availability) results in high ADG but reduced per acre gain and reduced profit. Regardless of the absolute amount of forage produced, it will usually be most profitable to graze it at a medium stocking rate (all areas of the pasture should be grazed, but forage should not be shorter than two feet).

3.) The absolute value of the cattle used in a grazing program is of importance if the cattle are to be sold at the end of the grazing period. The higher the absolute value, the more profitable the grazing program will be, assuming the same differential between buying and selling price. Thus, steers will gain more, given the same forage availability, than heifers and the value of the gain will be greater. Likewise, the gain added to "high quality" cattle will have a greater value than the gain added to poor quality cattle.

4.) Length of grazing season is important to profitability. The longer the grazing season (assuming the forage remains productive) the more profitable the grazing program tends to be. This is because the fixed cost of establishing the pasture are spread over more days, and the cost of fertilizer, per day, is reduced.

5.) Direct production costs and indirect cost are also important determinants of profitability. As either of these increase, the cost per



pound of gain increases, the impact of both of the costs can be determined and evaluated with reasonable accuracy while planning the millet grazing program.

### Problems with Millet

Probably, the most difficult aspect of managing a grazing program on millet derives from its growth pattern. Growth during the first 45 to 60 days is much greater than growth during the last 50 to 60 days. Thus, some system must be devised to utilize the forage as it grows. This may involve utilization of surplus forage with other classes of cattle, mechanical harvest of surplus forage for hay or silage, or staggered planting to improve the uniformity of forage availability.

In these studies, actual stocking rates on the low stocked pasture varied from a low of .6 steers per acre during the last of the trial to a high of 2.3 animals per acre three weeks after grazing started. On the high stocked pasture, the maximum stocking rate reached 7.5 animals per acre in order to maintain a high level of forage utilization.

Due to the relatively high cost of production, per acre per day, and the difficulty of managing forage utilization, millet probably is most effectively utilized by growing beef cattle.