

Phosphorus removal by silages of corn and varieties of forage sorghum and sorghum-sudangrass

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Phosphorus use by crops is becoming a greater issue in the Panhandle region. The cattle feeding industry and the dairy industry must maintain nutrient management plans for their facilities. A primary focus of these plans is the disposal of liquid and solid waste. Nitrogen and phosphorus are the two nutrients of interest in these plans. Because of an imbalance of N:P in manure relative to plant requirements, using these manures as a N source for crops and pastures can result in over application of P. Hence repeated applications can allow P to build up in the soil. Using crops that withdraw more P from the soil annually can aid in maintaining soil P levels below regulatory thresholds.

Phosphorus removal by various silages crops at the Texas A&M Bush Farm in Bushland, Texas are shown in Figures 1 and 2. The data represent two crop years. The silages have been grouped into general classifications based on type. Phosphorus removed by the crop (lb/ac) was calculated as the product of P concentration in the silage at harvest and the silage yield (lbs/ac). Phosphorus removed per inch of seasonal irrigation was calculated by dividing P removed per acre by inches of irrigation water applied. A full report of data used in these calculations and cropping practices can be found in the annual reports for these evaluations.

In these evaluations, corn silage removed between 38 and 40 lbs of P/ac (Figure 1). Most of the other types removed about that same amount except for the photoperiod-sensitive types (PS). Because the PS types were higher yielding, the amount of P removed was greater.

Figure 2 illustrates the P removed per ac inch of seasonal irrigation. Phosphorus removal was expressed in this manner because many areas surrounding dairies and feedyards may have limited or no irrigation capacity. Also, some of these facilities use cropland to dewater runoff lagoons. A crop that efficiently removes P per unit of water input (from rainfall or irrigation) would be beneficial. Phosphorus removal by corn silage (about 1.5 lb P/ac inch) was the lowest of all types and reflects the higher water requirement of the corn silage crop. The non-PS types removed about 2.7-2.8 lbs P per ac inch and the PS-types removed in excess of 3.2 lbs/ac inch.

Although crop selection will not be a complete solution to soil P issues, selecting types with higher P demands can aid in maintaining soil P below regulatory levels. These varieties may also accelerate the restoration of soil P to levels below regulatory thresholds. Based on these two years of evaluation, the PS-types appear to remove more P and use less water to do so. However, the PS-types generally have relatively lower energy densities and their use in beef or dairy cattle operations must be considered. The other sorghum or sorghum/sudangrass types appear a better alternative than corn when water applications are considered.

These data are based on averages of types. Variation is present within each type so comparison of individual varieties will be necessary when selecting varieties.

Figure 1. Phosphorus removal (lb/ac) by various silage crops

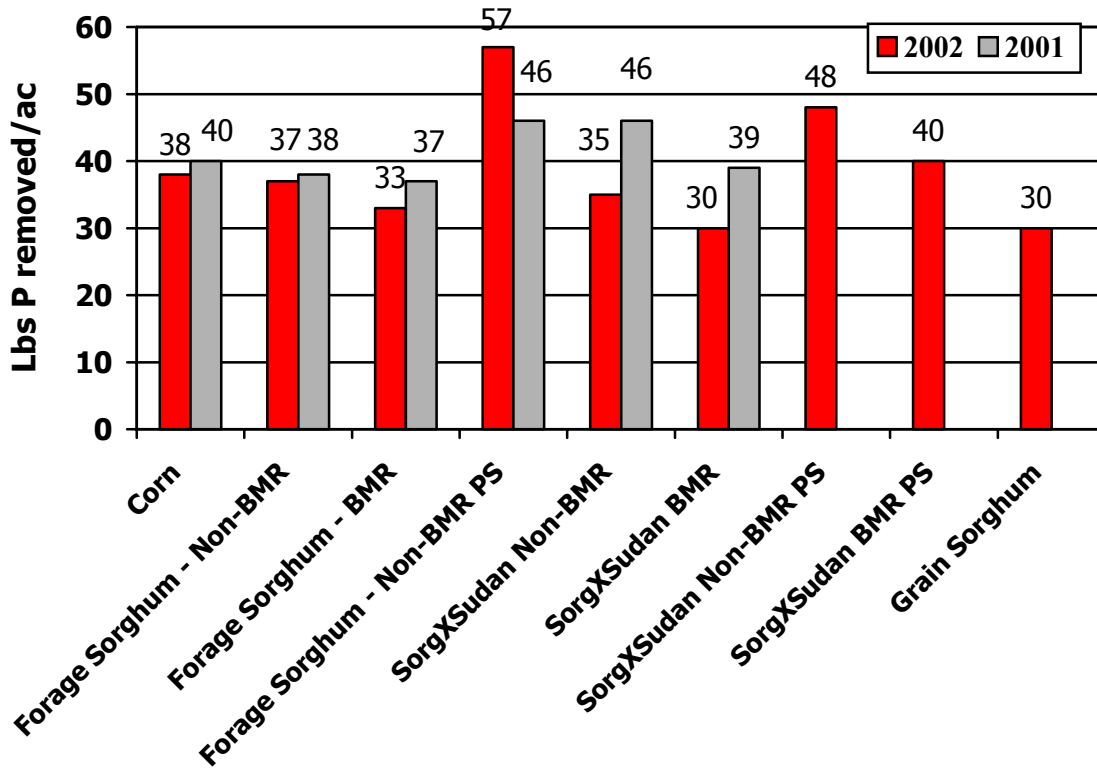


Figure 2. Phosphorus removal (lb/ac inch of seasonal irrigation) by various silage crops.

