RESULTS OF THREE SORGO TRIALS CONDUCTED IN ARKANSAS IN 1953

SORGO varieties developed for forage and syrup production require measurements in addition to yield in checking their adaptation for silage production. It is logical that green weight yields more closely resemble silage yields per acre than do dry weight yields. Varietal differences offer an approach to silage production from a breeding standpoint.

Green weight.—Sart, Tracy, White African, Atlas and Orange were grown at Fayetteville, Marianna, and Hope, Ark., in 1953. The five varieties ranked in the same order in green weight yields at each location as shown in table 1. Sart produced 19.69 tons of green weight yield per acre, Tracy 18.49, White African 17.21, Atlas 11.35 and Orange 11.14. Differences among varieties at each location and an average of all varieties between locations were found to be highly significant.

Percentage of stalks.—The stalks contributed an average of 77% of the total green weight yield of the five sorgo varieties, thus indicating their importance in silage yields. The mean percentage of stalk weight varied from 71.6 to 81.7. The three highest yielding varieties in green weight produced 81.7, 81.4 and 80.4% stalks. The green weight yield per acre varied by 2.48 tons among the three varieties. Differences among varieties at each location and an average of all varieties between locations were found to be highly significant. Green weight and percentage of stalks were found to be highly significant and positively correlated as indicated by a coefficient of 0.92.

Tons of leaves and heads per acre.—The tons of leaves and heads per acre varied from 3.81 for Sart, the highest green weight producer, to 3.14 for Orange the lowest green weight producer per acre. The increase in stalk weight is shown by the mean production of 11.14 tons of green weight per acre by Orange with 3.14 tons of leaves and heads per acre as compared to 19.69 tons of green weight and 3.81 tons of leaves and heads per acre for Sart. Orange produced 8 tons of stalks per acre and Sart produced 15.88 tons. There was no significant difference among two varieties grown at the Main Experiment Station. The varieties which produced the highest protein percentage were significantly high and were low in percentage of stalks. These varieties of sorgo which produced high yields were also low in stalk weight percentage, thus indicating their importance in silage yields.

Protein percentage.—The average percentage of stalks alone was 2.89, for leaves 7.61 and for heads 10.15 for two varieties grown at the Main Experiment Station. The varieties which produced the highest protein percentage were significantly low producers of protein percentage but were high in percentage of stalks.

Total solids (Brix).—A hydrometer was used to measure the density—total solids—of a given amount of juice. The varieties which produced high total solids were the highest producers of dry weight percentage. White African 21.16% and Orange 20.55%.

Sart and Tracy produced significantly higher yields than did the moisture involved. Differences among varieties in dry weight percentage suggest differences would be highly significant and positively correlated with the dry weight or percent moisture depending upon the method of expression.

Dry weight percentage.—The amount of nutrients consumed per day from silage by a cow is to be directly associated with the dry weight percentage of the moisture involved. Differences among varieties in dry weight percentage suggest differences would be highly significant and positively correlated with value of silage produced. An analysis of variance (based on transformed percentages) for percentage of dry weight showed significance among varieties and the interaction of varieties X locations. Sart, the highest producer of dry weight (24.08%), green weight yield and dry weight percentage was very close to the highest in percentage of stalks. Sart produced 22.41% dry weight, ranking second to the lowest in green weight yield and dry weight percentage of stalks. Tracy produced 22.38%, White African 21.16% and Orange 20.55%.

The dry weight percentage of the five varieties varied from 23.80 to 26.99 at Fayetteville, 20.55 to 23.80.