A Survey of Corn Silage and Earlage Characteristics Production and Use in Iowa

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Summary and Implications

Corn Silage and earlage are two common feeds for beef cattle. Both of these feeds can increase beef production per acre as compared to corn grain but require good management from production through feeding to optimize beef production. Little information has been collected about production practices that are being used in Iowa and if there is any correlation to the feeding value of the feeds.

Introduction

Approximately 349,000 acres of corn are harvested as corn silage in Iowa. (USDA Census of Ag 2012-2016) No data are available on number of acres harvested as earlage. A survey of production, harvesting, storage and feeding practices combined with sample analysis of feeds was undertaken to help characterize production and feeding practices and the nutrient analysis.

Materials and Methods

A survey was developed to gather data from producers who utilized corn silage or earlage. The survey included questions on acres harvested, verities used, type of harvesting equipment, estimated yield, storage methods and feeding practices. The survey was mailed to selected producers and made available on line to complete through the Iowa Beef Center website during the winter and spring of 2017. Ninety six completed surveys were returned. Forty six of the surveys were from producer using silage, 31 were from producers who utilized both corn silage and earlage, and 19 used earlage only.

Sample analysis of corn silage and earlage samples were offered to participating producers. Producers could take samples and send them to the lab or an Extension Beef Field Specialist did the sampling. Thirty five silage samples and 20 earlage samples were sent to Dairyland Labs for analysis. Corn silage samples were analyzed using the Near Infrared Complete Corn Silage analysis, which includes all nutrient analysis, digestibility analysis, and some fermentation analysis measures. Earlage samples were analyzed using the NIR UW Grain analysis which includes nutrient analysis, fermentation analysis and grain particle size analysis measures.

Of those completing surveys, 27 submitted silage samples and 20 submitted sample surveys.

In addition to the laboratory analysis, the Penn State Particle Separator was used when possible to evaluate particle size, mainly on samples collected by field specialists. Ten silage samples and 17 earlage samples were evaluated using the particle separator.

Results and Discussion

The surveys represented approximately 10,000 acres of harvested corn silage and 18,000 acres of harvested earlage. The average acres of corn silage harvested per individual was 129 acres but ranged from 8 to 1,000 acres. Earlage was harvested on an average 427 acres per individual operation but ranged from 7 to 2,800 acres. The majority of surveys (80%) were from producers in northern Iowa

Of those silage-only producers, 42 were cow-calf producers with an average herd size of 162 head. Thirty six of the producers were feedlot operators with an average size of 666 head one time inventory. For those producers who used both corn silage and earlage, 18 were cow-calf with average herd size of 262 cows and 30 were feedlot with average inventory of 1297 head. Of those with earlage only, they were all feedlot operators with an average inventory of 2,544 head.

Estimates, when provided, on corn silage yield ranged from 20-to 31 tons per acre (wet).and earlage yield ranged from 9.3 to 15.8 tons/acre (wet).

An average harvest time for silage was 1.44 hours per acre with a range of 1 hour to 6.7 hours per acre. Average harvest time for earlage was .025 days per acre with a range of .08 hours to .34 hours per acre.

Targeted cut length of corn silage averaged .625 inches and ranged from .25 to 1.5 inches. As compared to the particle separator evaluation, there was a trend to smaller particle size on samples as targeted cut length decreased.

Percent of those responding to questions on production, harvesting and storage of corn silage were the following:

32 % said they used a silage hybrid
60 % used a custom operator for harvest
72 % used a kernel processer
58% used an inoculant
37% used bunker storage
32% used a silage bag for storage
18% used a drive-over pile for storage
13% used an upright silo for storage
40% routinely tested moisture
66% were testing for nutrients.

Percent of those responding to questions on production, harvesting and storage of earlage were the following:

80 % were using a custom harvestor
58% used an inoculant
52.5 % used bunker storage
24.6 % used a bag for storage
13.1 % used a drive-over pile for storage

9.8% used an upright silo for storage.
66% routinely tested for moisture and nutrient analysis

The average targeted moisture for corn silage harvest was 63% with a range of 55 to 66 %. The estimated average moisture at start of harvest was 64% and at the end of harvest was 56%

The average targeted moisture for earlage harvest was 33.6% and the range was 30 to 40%. The estimated average moisture at start of harvest was 36% and at the end of harvest was 31.5%

For those using bunker or drive-over pile storage for corn silage, packing time per load averaged 8.4 minutes per load and the range was from 2 minutes to 15 minutes per load, and packing equipment most commonly used was a four wheel drive tractor with a blade. A cover was used by78% of those using a bunker or drive over pile.

For those using bunker or drive over pile, storage for earlage, packing time per load averaged 10.7 minutes and the range was from 3.5 minutes to 30 minutes per load. Packing equipment most commonly used was a four wheel drive tractor with a blade. Covered bunker or pile was used by 92% of those using a bunker or drive over pile.

There was considerable variation in practices used in silage production, harvest and storage by producers represented in the surveys. The sample analysis data was sorted by several of the characteristics of production, harvest and storage in the survey responses. No major differences in averages of the nutrient analysis were observed.

The majority of those using corn silage or earlage fed those in total mixed ration. The following tables show the average and range of percent corn silage or earlage being fed in diets on an as fed basis across all those who responded. 42% indicated they used corn silage as primary source of effective fiber in the diet.

On average, the 42% of producers using corn silage as effective fiber had higher inclusion percent of corn silage in diets than the 58% that did not indicate that corn silage was the primary source of effective fiber. For 400-600 lb. cattle, corn silage was 20 percentate points higher in the diet and 12-13 percentage points higher on other weight ranges. For beef cows the inclusion percent 100-200 days pre calving was 19 % points higher, 16 % points higher immediately after calving and 5 to 7 % points higher in the other two defined periods. Average targeted cut length was .63 in for those using corn silage as effective fiber and 1 in for those indicating it was not the primary source of effective fiber.

Table 1. Average and range of percent corn silage as-fed included in diets for feedlot cattle and beef cows

	Feedlot cattle weight ranges in lbs. of			
	400-600	600-800	800-1000	>1000
Avg	26.46	24.04	16.35	11.58
Min	5.00	5.00	5.00	4.00
Max	80.00	70.00	60.00	70.00

	Beef cow stage - days relative to calving			
	100-200 pre	100 to calving	Calving to 50 post	50-100 post
Avg	33.76	38.84	27.72	13.38
Min	10.00	10.00	10.00	20.00
Max	75.00	80.00	75.00	50.00

Table 2. Average and range of percent earlage as-fed included in diets for feedlot cattle

	Feedlot cattle weight ranges in lbs.			
	400-600	600-800	800-1000	>1000
Avg	30.0	36.0	38.2	35.0
Min	5	10	10	10
Max	95	75	75	80

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