

THREE GREAT KANSAS FORAGE CROPS--
ALFALFA, CORN, and KAFIR-CORN.

by

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In treating this subject we will only consider the feeding value of the fodder of these crops, and will not consider the feeding value of the grain, but will compare the feeding value of each as compared with the cost of production and in this way will show which is the most profitable crop for the stockman to feed, also for the farmer to produce.

ALFALFA:-

Description: Alfalfa is an upright branching smooth perennial plant, growing from one to three feet high, according to conditions. When in bloom it presents a purple or violet color, the flowers instead of being in a head like clover, are in a long, loose cluster or raceme. These are scattered over the plant. The ripe pods are spirally twisted through two or three complete curves, and each pod contains several seeds. Compared with clover it yields heavier.

History:- Alfalfa or Lucerne has been cultivated for ages, it was familiar even with the Egyptians, Medes, and Persians. It is said to have grown spontaneously on the high desert regions of Southern and central Asia. It became known in Greece about the time Xerxes invaded that country or about 450 B. C. and was prominent in Roman agriculture before the Christian era. The Romans valued it very highly as forage for the horses of their armies.

It was introduced into Spain and southern France from Italy and was carried to Mexico during the Spanish invasion. It was brought from Chili to California in 1854, it soon spread eastward and is now in nearly all of the western states. It is said to have been introduced into New York in 1820 but did not seem to have been valued very highly.

Varieties: Besides the common variety, Medicago

Saliva, that we are acquainted with here in Kansas. There are two other varieties, they are the intermediate Lucerne, Medicago Media, and the yellow or sand Lucerne, Medicago falcata. But these have very little value as a crop, yet the yellow is sometimes recommended for planting in very light, sandy soil.

Harvesting Alfalfa: Experiments have proved that for the best results alfalfa should be cut for hay when it begins to bloom, as all animals prefer the early cut hay.

The hay should be cut and raked into windrows the same day and stacked or put into the mow as soon as it is dry. If allowed to become too dry the leaves will shatter off and be lost.

The side delivery rakes, loaders, or buck rakes, and hay forks or stackers are used so there is very little handling. The hay can be put into mows or stacks when the stems are quite tough without much danger of "burning" if air slacked lime is sprinkled over the hay when stacked at the rate of from 10 to 15 pounds per ton. Or if the season be wet it may be stacked with alternating layers of straw. The most important point in harvesting is to get the hay stacked or into the mow without getting it wet. It is estimated that a rain of one-half or one inch will damage the hay from 25 to 50 per cent.

When the hay must be stacked in the field the stacks should be made narrow at the bottom and bulge somewhat up to a convenient height to begin topping it out. The stacks should either be covered with lumber, slough-grass or green hay as alfalfa hay does not shed water well.

INDIAN CORN:-

Indian Corn, the Zea Mays of botanists, is unquestionably a native to America and especially adapted to Kansas. Before the dis-

covery of this country by Columbus, this cereal was unknown in Europe, Asia or Africa. Maize was undoubtedly grown by the inhabitants of North, Central, and South America in prehistoric times.

The original home of Indian Corn is thought by some to be Central America or Mexico south of the twenty-second degree of north latitude.

Varieties: With corn as with many other crops there are many varieties that give good returns.

The Kansas Experiment Station recommends the following varieties as being well suited to Kansas conditions:

WHITE VARIETIES.

YELLOW VARIETIES.

- Hartman's Early White.
- Champion White Pearl.
- Chester County Mammoth.
- Boone County White.
- Piasa Queen.
- Thoroughbred White Flint.

- Leaming.
- Pride of Kansas.
- Capital.
- Early Mastodon.

Professor Georgeson has the following to say in regard to varieties. "I have no great admiration for the very early kind for our purpose. So far as my observation goes, if dry weather sets in early enough to spoil medium and late corn it will spoil the early corn also; and in a good season the early corn never gives as good returns as the medium or late varieties.

Indian Corn In Kansas: Any one, even moderately familiar with Kansas Agriculture understands that the State's premier crop is corn, although at the same time the most enthusiastic advocates of her productive possibilities make no claim that the western two-fifths of the state or the thirty-nine counties west of the ninety-ninth me-

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ridian are especially or reliably corn growing territory. The corn yield, which in the twenty-five years closing with 1895 have had an annual value exceeding \$31,000,000.00 or a total value during that time of more than \$776,000,000.00 has mainly been grown to the eastward of the north and south center line. In spite of this and three very disastrous seasons--in one of which the crop was less than nine bushels per acre--The average yield for all the wide area planted in the thirty-four years of which we have records has been twenty-seven bushels per acre and in ten of these years ranged from forty to forty-eight bushels per acre.

Justly famed as many of our wheat crops have been, statistics reveal a fact surprising to casual observers, namely, that in the quarter of a century mentioned the aggregate value of the corn crop of Kansas has been very nearly double that of the winter and spring wheat crops combined; and further that in no year of the state's history has the value of the wheat approached in magnitude that of the same year's corn crop. The average value of Kansas corn per bushel for twenty-five years has been 27 1/5 cents and per acre \$7.31.

KAFIR-CORN:-

Kafir-corn belongs to the non-saccharine groups of sorghums, and in its habits of growth and development is very similar to the common sweet sorghum except that it does not contain sugar. Under ordinary conditions it grows from five to seven feet high, and when not planted too closely the stalks are large and heavy. The joints are short ranging from four to six inches long; the leaves are set the same as those of Indian corn and range from one to two and a half feet long, being a darker green than corn and somewhat stiffer. The grain appears on the head the same as on other canes, the heads reaching a length of from twelve to sixteen inches. The heads are compact and do

not spread out. The mature head looks as if composed entirely of grain, there being no stem in sight at the base.

Varieties: There are many varieties of the non-saccharine sorghum but only three that have come under the name of Kafir-corn. The name "Kafir" comes from a tribe of natives of South Africa whose country is known by the name of Kafir. Kafir-corn is sometimes known as African Millet. The three varieties which have received most attention are, in the order they were introduced: The White; Red; and the Black-Hulled White. The last may be easily distinguished from the first by noticing that the chaff or hull which partly envelopes the grain is black while in the first the chaff or hull is nearly the color of the grain. In the Red Kafir-corn the color develops as the seed matures, and at maturity is very nearly a brick red.

Yield: The White Kafir-corn with some is the favorite for fodder, and all varieties have their admirers, but at the Kansas Experiment Station the Black-Hulled White has been found to give the best results. It has proven the heaviest yielder in both grain and fodder and if there is any difference between it and the Red Kafir-corn for resisting dry weather it is in favor of the Black-Hulled White. There is a greater difference between the Red and White varieties in these respects than between the Red and Black-Hulled White. For seven years the Red and Black-Hulled White were raised side by side, the Red giving an average yearly yield of thirty-seven bushels per acre and the Black-Hulled White, forty-three bushels per acre.

ECONOMIC FEEDING VALUE OF ALFALFA, INDIAN CORN, AND KAFIR-CORN:-

The digestibility of alfalfa is changed less by the process of curing than that of any other forage plant. Dry alfalfa hay is about as palatable to animals as the finest Kentucky blue grass. The

ideal way to feed alfalfa is as hay. This saves the labor of handling the excessive amount of water present in the green plant. Fed dry the danger of bloating is reduced to the minimum, and the quality of the feeding constituents is not reduced by the dryness in the least. The only way alfalfa hay is liable to deteriorate in value is through poor handling or exposure to bad weather.

Alfalfa hay possesses the succulent qualities of green grass in June, keeping the digestive organs open and active; it has a cooling effect on the blood and cannot be surpassed as a feed for cows during calving time. Fed to dairy cows alfalfa maintains the flow of milk equal to June grass for nearly the whole year.

The digestion experiments at the Kansas Experiment Station show the average digestible protein in prime alfalfa hay to be 12.9# in every 100# of hay. According to this one acre of alfalfa yielding three tons of hay per acre would produce 774 3/4 pounds of digestible protein, while an acre of corn yielding thirty-six bushels per acre would produce in the grain only 157 pounds. Since protein is absolutely essential to the production of milk and beef we can readily see from these figures the comparative value of corn and alfalfa hay.

Comparing corn stover with alfalfa hay in composition we find it to be as follows, for each 100 pounds:

Feeds	Protein	Carbo-Hydrates	Fat
Alfalfa 1/2 in bloom	14.57	68.41	1.35
Corn Stover	3.8	51.2	1.1

Figuring this per acre and estimating the yield of alfalfa

hay at three tons an acre and corn stover at two and one-quarter tons per acre, which I believe is a fair estimate, we have the following:

Feeds	Protein	Carbo-Hydrates	Fat.
Alfalfa	874.2	4104.6	81.0
Corn Stover	133.	1792.0	38.5
Difference in favor of alfalfa	741.2	2312.6	42.5

Now consider the cost of production of these two crops than we can compare their feeding values.

Making estimates of cost per acre of corn stover from yields of forty bushels per acre and where the land is plowed and well harrowed and planted with the ordinary check-rower, summarizing for each item as follows:

Seed	\$0.05
Plowing	1.25
Harrowing Twice25
Planting25
Cultivating Three Times	1.25
Harvesting	1.35
Husking & Cribbing	1.60
Wear, Tear, And Interest on Cost of Tools25
Rent of Land or Interest on its Value	2.75
Total	<u>\$8.90</u>

The cost of raising one acre of alfalfa hay may be summarized as follows:

Seed.	\$2.65
Plowing	1.25
Harrowing Twice25
Planting.28
Harvesting.	3.75
Wear, Tear, and Interest on Cost of Tools	.25
Rent of Land or Interest on its value . .	2.75
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Total	\$11.28

Suppose alfalfa is seeded in the fall, by these estimates we see that the cost of raising the first crop of alfalfa hay is \$2.38 per acre more than the cost of growing one acre of corn, but this is hardly a fair estimate as we are considering the cost of seeding the alfalfa each year which we do not do. Let us consider the alfalfa as being grown as a rotation crop in a five year's series and allow one-fifth of the cost of seeding to each season's crop. If we estimate it in this way it will only cost \$7.64 per acre to produce it or \$1.26 less per acre than the corn.

But let us compare the commercial value of the two crops. Three tons of alfalfa per acre at \$6.00 per ton would be \$18.00 per acre for the hay, minus the cost of production \$7.64 leaves a net profit of \$10.36 per acre. While for corn estimating the value of the fodder at \$2.00 per ton, and a yield of two and one-quarter tons per acre of fodder, and the grain at forty bushels per acre worth \$.25 per bushel gives a gross income of \$14.50, deducting the cost of production leaves a net income of \$5.60 or \$4.76 less profit from the corn than from the alfalfa per acre.

Estimated on its commercial value according to chemical analysis one acre of alfalfa hay produces 874.2 pounds or 6.5 times

as much protein, 4104.6 pounds or 2.29 times as much carbo-hydrates and 81 pounds or twice as much fat as corn stover. Hence we see that from both the commercial value and chemical analysis that alfalfa hay is far superior to corn stover as a feed as it is much richer in the essential constituents that go to produce muscle, bone, and fat.

The following table shows the comparative yield of Indian corn and Kafir-corn grown side by side on the Kansas State Agricultural College farm for seven successive years beginning 1889 and ending 1895.

Year	Red Kafir-corn		Indian Corn.	
	Grain per acre bushels.	Stover per acre Tons.	Grain per acre Bushels.	Stover Per Acre Tons.
1889	71.00	9	56	2.5
1890	19.	4.2	22	2.5
1891	98.	6.	74	2.95
1892	50.	5.	30	4.55
1893	49.	5.25	30	1.75
1894	--	2	---	1.00
1895	43.07	1.53	2.76	1.64
Average	55.01*	4.71	39.12*	2.41

*Average for six years.

This table shows that the Kafir-corn yielded about 41 per cent more grain and nearly 95 per cent more stover than the Indian corn

Now if we compare the feeding value of Kafir-corn fodder with Indian corn stover we get the following results:

DIGESTIBLE NUTRIENTS IN 100 POUNDS OF FEED.

Feeds	Protein	Carbo-Hydrates	Fat
Kafir-Corn Fodder	3.5	52.83	1.3
Corn Stover	3.8	51.2	1.1

In one acre it would be as follows:			
Kafir-corn Fodder*	280	4224	104.00
Corn Stover*	133	11792	38.5

*Yield of Kafir-corn four tons per acre, Indian corn two and one-half tons per acre.

Now if we consider the cost of producing one acre of Kafir-corn to be the same as for Indian cornstover, from the above figures we get practically twice as much protein, two and one-third times as much carbo-hydrates, and nearly three times as much fat from one acre of Kafir corn fodder as from one acre of Indian corn stover at the same cost. Now if we rate the commercial price of each of these feeds the same, say \$2.00 per ton, the income per acre from Kafir-corn fodder will be nearly double, but this is not all, the table on another page shows that the yield of grain from Kafir-corn to be 41 per cent more than from Indian corn for an average of six years, being 55.01 bushels for Kafir-corn and only 39.12 bushels for Indian corn or 15.89 bushels of Kafir-corn more per acre. Valuing the Kafir-corn at 35¢ per bushel and the Indian corn at 25¢ per bushel and the fodder of each at \$2.00 per ton we get a balance of \$14.07 per acre more from one acre of Kafir-corn than from one acre of Indian corn.

These figures show very ~~clearly~~ ^{clearly} which feed it will pay the farmer to buy and also which one will be the most profitable for the far-

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mer to raise. The Kafir-corn yields more grain per acre than corn and twice the amount of fodder, and has a feeding value per acre double to that of corn.