FORAGE NOTES --***-- A SPECIAL EDITION

- This is a special issue of FORAGE NOTES, the little publication of the FORAGE CLUB and which goes out each month to the membership of the Club. Any person interested in Forage Crops is eligible for membership.

- This Special Issue is sent you by, and with the compliments of, the Commissioners of the Mills County Soil Conservation District. This Special Edition was made up of items carried from month to month in recent issues and which were selected by your commissioners because of their special value to you, They believe that you will find items of more than usual interest and value to you in each issue of the year, and that you therefore may wish to become a member of the FORAGE CLUB for 1949 and receive FORAGE NOTES EACH MONTH.

- The Forage Club now has a membership of about 675, most of them in Iowa but with many also in other states. The membership is $1.00 for the calendar year.

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FORAGE NOTES

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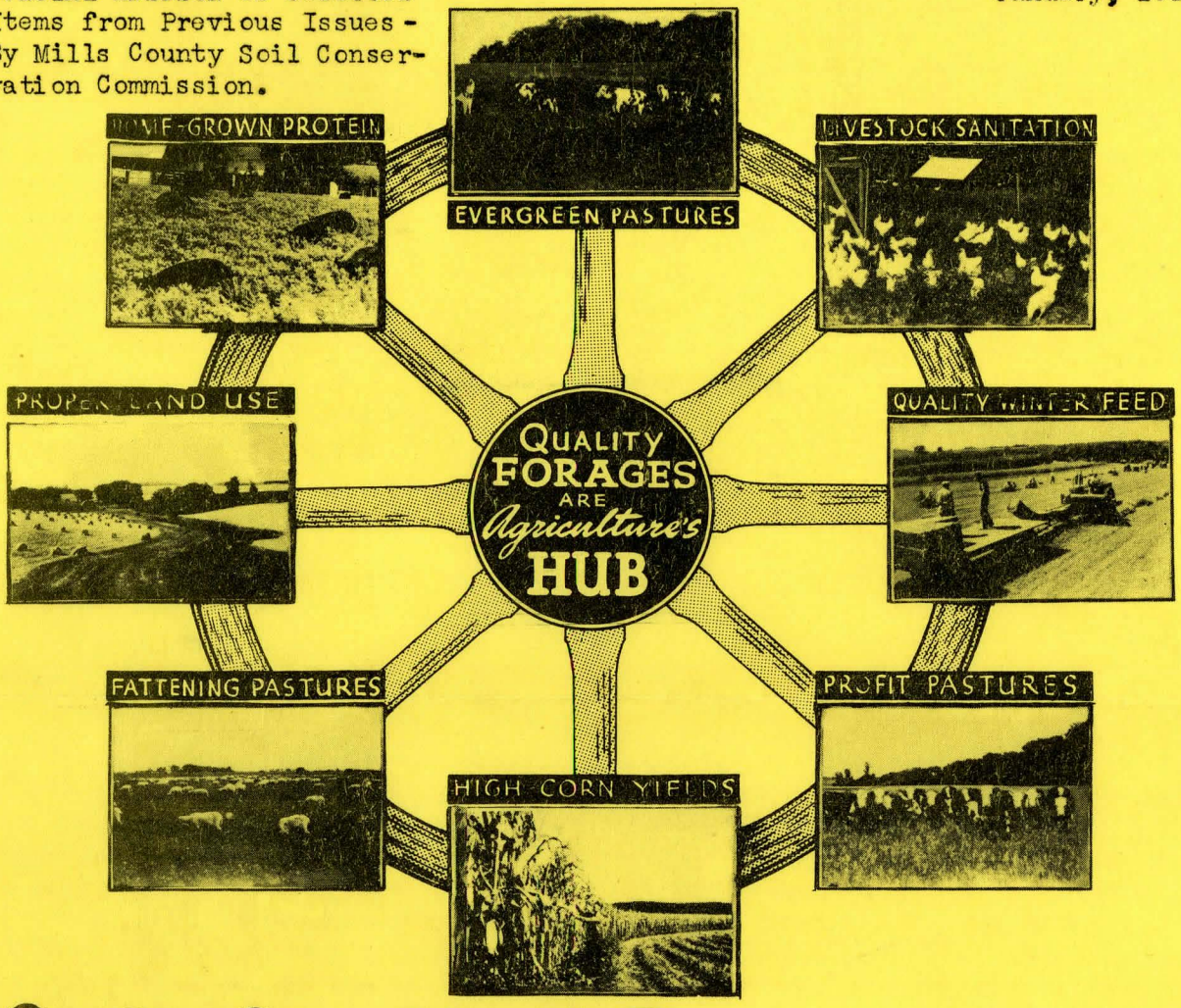
January, 1949



In This Issue You'll Find...

THE FORAGE CLUB

Purpose: To study and promote the improvement, production, and utilization of high quality, high yielding forages, in view of the need for further conservation and improvement of our soil resources and for increased economy in the production of livestock and livestock products.

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II. PRODUCTION AND UTILIZATION - M. L. Peterson & G. M. Browning.
III. ANIMAL NUTRITION - C. Y. Cannon and E. L. Quaife.
IV. HARVEST AND STORAGE - E. L. Barger and Bruce Liljedahl.
V. ECONOMICS OF PRODUCTION AND UTILIZATION - Earl Heady and J. J. Wallace.
VI. FARM APPLICATION - Paul Strickler and Reid Lyford.

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22. Randolph, Oris. BROMEGRASS PASTURE VALUE PROVED. June, 1945. Jones County Soil Conservation District. (Page 15 in December, 1945, FORAGE NOTES)

Fourteen acres of bromegrass and alfalfa pastured 43 head of steers and produced 426 pounds of beef per acre in 1944 for Ed Sazma, farmer one mile north of Oxford Junction. In addition to the 43 steers, two cows, a veal calf and two horses were in the 14-acre pasture a part of the season.

Gain on the steers was computed from the buying weights in the fall. Twenty-five of the steers put in the pasture averaged 325 pounds, six 700 pounds, and twelve 750 pounds. The steers received no grain.

The alfalfa and bromegrass were seeded in the spring of 1942 with oats. In 1943 one crop of hay was cut and the field pastured with hogs and cows for the remainder of that season. The steers were turned on the field in 1944 after the brome was several inches high. This field had been limed a number of years ago and seeded to alfalfa. It then produced a couple of crops of corn and was given a light application of limestone just previous to seeding the alfalfa and brome. Superphosphate (0-20-0) at the rate of 200 pounds per acre was applied on the present seeding.

(Kenneth King)

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"The ley (rotation pasture), I am convinced, makes a cheapening in all-round production. Elliott was no idle flatterer of the ley when he exclaimed 'the cheapest food for stock was grass; the cheapest manure for soil, turf; the cheapest tiller and drainer of soil, roots'" (Sir Geo. Stapledon -- from GREEN PASTURES.)

44. Thatcher, L. E., Willard, C. J., and Lewis, R. D. WHY DO SEEDINGS FAIL? pp. 6-14. Bul. 588. Dec. 1937. (Ohio Agr. Exp. Sta., Wooster, Ohio.) (Page 33 in March, 1946, FORAGE NOTES.)

1. The seed may fail to germinate because of:

   a. Dead or weak seed: Caused from age, harvesting before mature, improper drying and storage. "Test, don't guess."

   b. Hard seed: An example is unscarified sweetclover.

   c. Unfavorable seeding conditions: May be a result of insufficient moisture, unfavorable temperatures and insufficient air.

2. The seedlings may be killed before establishment by:

   a. Freezing: Soil temperatutes below 26° F. will kill most legume seedlings at the time the root is emerging or slightly later.

   b. Too deep coverage: The method of seeding and date of seeding are both concerned with the question of coverage. (Not over $\frac{1}{4}$ to $\frac{1}{2}$ inch on silt soils. Ed.)

   c. Crusts on the soil: On soils where crusting is a problem rough surface but firm seedbed and mulches such as strawy manure should be encouraged. Increase organic matter by using grass-legume mixtures in longer rotations and a shorter interval clean-tilled crops.

   d. Drying out of seedbed: To avoid loss of stands from drying seed early in the spring use firm seedbed, proper coverage and use of mulches are helpful.

3. Seedlings may become established, but die thereafter from:

   a. Lack of inoculation of legumes: Inoculation should be provided if the field has not grown the legume, or one in that inoculation group, in past five years.

   b. Unfavorable soil conditions: There may be inadequate calcium, phosphorus and other minerals. All common legumes except sweetclover make their best growth at pH 6.8. Apply manure on poor soils to help insure stands.

   c. Insects and diseases: Examples are alfalfa and lespedeza bacterial wilt and root rots, chinch bugs, grasshoppers, leaf hoppers, and the clover leaf weevil.

   d. Drouth: In general, grass seedlings are less drouth resistant than the legumes. Soil type and competition from weeds and companion crops are interrelated.

   e. Competition of companion crops: Generally, the cereal crops are grown to (1) produce a return from the land during the seeding year, (2) to control erosion while grasses and legumes are becoming established and (3) if not used, a more harmful companion crop of weeds may result.

   In general, the less the growth of the small grain companion crop under a given soil situation the better the seeding in it.

f. Competition of weeds: Use of cereal companion crops and timely mowing are helpful.

g. Poorly adapted seed: Examples of unadapted seed are alfalfa from Arizona and South America; red clover from Europe; northern bromegrass when used in southern and western Iowa. Use only recognized strains and varieties of known origin.

h. Winterkilling: May be caused by late seeding, untimely clipping, poorly adapted varieties or the lack of a grass with the legume to help furnish protection from alternate freezing and thawing.

(Maurice E. Heath)

64. Browning, G. M. FORAGES IN RELATION TO SOIL AND WATER CONSERVATION.[1] (Page 50 in May, 1946, FORAGE NOTES)

The use of forages is the first and most important factor in the development of a sound land-use program to conserve soil and moisture, as well as to maintain or increase crop yields on farms. Grass-legume combinations with their numerous leaves and stems intercept raindrops and prevent sealing and crusting of the soil surface, allowing water to penetrate the soil. Forages reduce the velocity of water and gullies are prevented where waterways are grassed.

Grass and legume roots are very important in the development of good soil tilth. A very loose, granular soil structure formed under the native grass vegetation in the tall-grass prairie area of the cornbelt. This condition encourages rapid absorption of water and decreases the susceptibility of the soil to erode. But cultivation of a soil is similar to a fire, in that it increases the biological activity and burns up the organic matter, resulting in increased soil loss.

When forages are used regularly in the rotation they furnish a supply of organic materials which on decomposition bind individual soil particles together in clumps or aggregates. As the percentage of the larger aggregates increase, air and water relationships are improved, reducing soil and water losses. As a ten-year average at the Soil Conservation Experimental Farm in Page County, soil loss under continuous corn was 40 tons per acre, twice that from corn grown in a rotation of C-O-M. Less than two-tenths of a ton per acre was lost from the meadow.

In 1945, on the Clarinda farm, the yield of corn was 24 bushels per acre on an area continuously cropped to corn since 1931, whereas on an adjoining area in a C-O-M rotation through the same period of time the corn yield was 94 bushels. Only when forages are included regularly in the rotation will air and water relationships be maintained which are favorable to maximum yields. Liming, fertilization, and other good soil management practices are not enough.

1/ Dr. Browning, in charge of research at the Clarinda farm, cooperator between the Iowa Station and the Soil Conservation Service, was the Forage Club speaker for April, 1946. This is a brief digest of outstanding features.

103. VALUE OF FORAGES IN THE ROTATION. (Soil Conservation Service, Ames, Iowa.) (Page 82 in September, 1946, FORAGE NOTES.)

Grasses and legumes not only are the most efficient crops in keeping soil and water at home but are one of the key factors in stepping up and maintaining corn yields. At the Soil Conservation Research Farm in Page County on Marshall silt loam, the following corn yields were obtained following different crops:

	Corn Yield Per Acre	% Increase Over Check	Year
15 years continuous corn	24.3 bu.	Check	1945
Corn - oats - meadow	94.4 bu.	388	1945
Continuous alfalfa (1931-1942)	106.3 bu.	437	1943
2nd year corn	83.5 bu.	343	1944
3rd year corn	72.9 bu.	300	1945
Continuous bluegrass (1931-1942)	75.7 bu.	311	1943
2nd year corn	68.9 bu.	283	1944
3rd year corn	77.0 bu.	316	1945

As these results indicate, legumes alone have a stimulating effect on corn production, while grasses alone have a depressing effect. It is only when grasses and legumes are used in combination and plowed down while highly productive that nutrient balance is approached, with corresponding results in high corn yields.

As an average, where corn followed corn in the rotation, the yield of first-year corn was 16.9 bushels greater than second-year corn, or an increase of 25 percent. The stand on first-year corn was about 15 percent better than on second-year corn. It also was observed that silting in and crusting over in the listed furrows was worse on second year corn than on first-year corn after meadow.

(G. M. Browning)

6. Sitler, H. G., and Fiske, C. A. HAY HARVESTING METHODS IN SOUTHEASTERN NEBRASKA, 1945. (FM 60, USDA B.A.E., Washington, D. C.) (Page 5 in January, 1947, FORAGE NOTES.)

The authors, reporting on a Nebraska survey of hay harvesting methods, give the following summary:

(1) This report centers around three methods of harvesting hay: loose, baled, and field chopped.

(2) The model crew per farm, was 6 men for loose long hay, 8 for baled and 4 for field chopped hay. The smaller crews are more easily assembled and the decrease in strenuous work may attract men to work on farms using choppers.

(3) In a 10-hour day the baler and chopper crews each stored on the average 25 tons of hay from the windrow. Only 17 tons were stored by the loose long hay crews. This saving of time in storing hay is important in this area where hay is frequently damaged by rain.

(4) Although hay was put into storage at equal rates per crew for balers and choppers, the chopping method used only half as many men per crew. Labor requirements per ton from windrow to storage were: 3.4 man-hours for loose long hay; 3.5 for baled hay; and 1.4 for field-chopped hay.

(5) In 1945 the cost per ton for placing hay in storage from the windrow: $3.52 for loose long hay; $3.77 for baled hay; and $2.89 for field-chopped hay. When choppers were used, equipment costs were about 14 percent of total harvesting costs, compared with 17 percent for loose long hay and 13 percent for baled hay. Equipment costs per ton vary with the tonnage handled per machine. As the tonnage of hay chopped per machine increases, the total cost per ton declines appreciably and the advantage of chopping compared with handling loose long hay increases.

(6) The investment for haying equipment - hay loaders, baler, chopper, blower running gears, racks, forks, rope, and boxes - was: $183 for loose long hay equipment; $957 for baled-hay equipment; and $926 for field-chopped hay equipment. The approximate cost new (average of price quotations of several machinery companies, F.O.B. factory) for these same items of equipment were: $411, $1,196, and $1,048, respectively. The farmers interviewed tended to own loose and baled-hay equipment individually, but shared in the ownership of chopper equipment.

(7) The hard, strenuous work of haying, particularly that of storing hay back in the loft, was eliminated by the use of the chopper method. Farmers consider this a big advantage.

(8) In the opinion of farmers chopped hay kept as well as loose or baled hay, but the chopped hay was cured longer in the field.

(9) Farmers indicated that there was less waste in feeding chopped hay than in feeding loose long or baled hay. In the opinion of farmers feeding chopped hay, it seemed to "go further" than loose hay in feeding livestock.

(10) More information is needed on keeping quality and relative feed value of chopped hay.

(E. L. Barger)

9. BROME-ALFALFA MOST PROFITABLE PASTURE. (Soil Conservation Service, Denison, Iowa.) (Page 8 in January, 1947, FORAGE NOTES.)

"Knee-deep brome-alfalfa pasture can replace one-third of the corn and supplement needed to put gains on beef cattle" said Julius Rohwer, Schleswig banker and farm operator, at the Harlan Bro-falfa Club's annual meeting on Tuesday, Feb. 5, 1945.

Mr. Rohwer spoke from his own experience in feeding Hereford and Angus baby beeves. "Brome-alfalfa pasture stores up humus and nitrogen. There is very little soil and water run off. Feeding on high producing brome-alfalfa pastures takes a minimum of labor. A fine field of brome-alfalfa adds to the appearance of the farm. In every way brome-alfalfa acres (used as pasture and as hay for livestock), are the most profitable acres on the farm."

Mr. Rohwer submitted the following on the utilization of a good 20-acre field of knee-deep brome-alfalfa. Livestock kept on it: 16 sows and their litters;

seven cows and calves; 18 head of feeder calves bought on the market. Corn saved by pasture: 25 head of cattle, 6 lbs. per head per day for 140 days. Total saved by pasture 21,000 lbs. or 400 bu. Feed saved per pig; four bushels, or 400 bushels total for 100 pigs. Total 800 bu. of corn saved. Value $800 or $40 per acre return from brome-alfalfa. The pasture also furnished feed for the 16 brood sows and seven head of stock or milk cows.

(Reid B. Lyford)

22. WHAT IS A HIGH QUALITY SOD? (Page 16 in March, 1947, FORAGE NOTES.)

Just what is a SOD anyway? We talk glibly about SOD in this day of agricultural technology. Is there such a thing as a high quality SOD, or a poor SOD? You hear a trained agricultural worker talk of a red clover SOD, an alfalfa SOD, or a bluegrass SOD. Are these all qualified to be paid the same compliment of being called a SOD? Or is SOD a compliment?

Webster defines SOD as "that stratum of the soil which is filled with grass roots." It may be a heavy SOD (16,000 lbs. of grass roots in acre plow layer, dry wt.), or a light SOD (2,000 lbs., or less), depending upon the grass species used and growing conditions. Did you ever examine the roots of sweetclover, red clover and alfalfa? If so, did you find anything SODDY about these legumes? Indeed not! SOD belongs strictly to the grass family. However, the quality of SOD can be improved by growing legumes with the grass. The SOD can be further improved when livestock are allowed to graze the aftermath rather than remove it for hay or silage.

Isn't it time that we talk about quality of SOD? How can we best express quality of SOD? Haven't farmers through the years been expressing quality of SOD when they talk of corn yields? In other words it may be a 40-bu. or a 90-bu. SOD. In the case of Mr. Babbit, of Shelby County, in 1946, it was a 180-bu. SOD. Why not use first-year corn yields as an index of quality of SOD? One-hundred-bushel SODS are within the reach of practically every Iowa farmer. Such SOD is the solid foundation to SOUND soil conservation and soil fertility programs on individual farms.

(The Editor)

63. Geske, E. J., and Showalter, W. J. GRASSES GUARD THE SOIL. Nat'l Geographic Mag. Vol. 39, No. 6. 1921.[1] (Page 47 in July, 1947, FORAGE NOTES.)

"Today, of all the plants that cover our earth, grasses rank second to none in importance. In the matter of utility to man and beast, no plant or group of plants has ever played so great a part in the history of the world, and we may well say with Solon Robinson that 'Grass is King' ....

"Grasses are the overseers of the soil. What is more irresponsible than the sands of the seashore and of the desert? Driven hither and thither by every shifting wave and wind, they now drift here and lodge there. Now they bury the forests, now they expose the bones of those who lie asleep in God's Acre, while in the waste spaces of the earth the sand storm overwhelms the traveler and his caravan.

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[1] Abstracted from the article entitled "Familiar Grasses and their Flowers," pp. 625-636. Eight excellent enlarged colored plates are shown of flower parts of different common grasses.

"If it were not for the grasses, the soil of the hillside and plain would be as shifting as the sands of seashore and desert. Every raindrop would be a vehicle on which a grain of the soil would steal a careless ride down to the sea.

"But the grasses pin the soil down to its duty. The barren hillside may become a mass of gullies and gulches, but where the grass is master, the soil becomes a faithful servant of man. Even the trees and shrubs would not possess a sure footing, did not the grasses help hold down the soil around them.

"Though of all plants the most common, the grasses are of all common plants the least known. ....."

(Editor)

84. GEARING A FARM FOR HIGH SUSTAINED PRODUCTION. (Soil Conservation Service, Burlington, Iowa.) (Page 69-70 in September, 1947, FORAGE NOTES.)

Brome-alfalfa is used for hay, pasture and silage on the 150-acre Ira H. Lee farm 10½ miles north of Burlington, Iowa, at the edge of the Mississippi River bottom. Mr. Lee says, "I get more dollars from my forage acres than my corn acres." You'll find one acre of forage for every acre of corn on the Lee farm. An 8-year rotation is in use as follows: C-C-C-oats-wheat-brome-alfalfa (three years).

A 16x50-foot silo is filled from 35 acres of the first cutting of brome-alfalfa. No preservatives are used. "Never cut down and windrow more forage than you can chop and put in the silo in a half day," stated Lee. At silo filling time in June, two steel-bottom dump trucks with drivers are rented. The two trucks will allow the field cutter to run continuously and give excellent unloading performance at the silo. When the blower pipe begins to film over a small stream of water about the size of your little finger is allowed to run into the blower while two loads of forage are being unloaded. This is sufficient to clean out the blower pipe. This is repeated when necessary.

When Mr. Lee was asked what it was he liked most about brome-alfalfa silage, he replied, "When you fill the silo with corn you're wearing out your ground - with brome-alfalfa you're improving your soil. With grass silage it's just like good pasture 12 months of the year for those dairy cows."

In 1946 one 28-acre field of alfalfa filled the silo within 6 feet of the top and later yielded 253 bales of hay. In addition, 165 spring pigs and 15 dairy cows were pastured most of the summer. In the fall of 1946, 60 head of 825-lb. steers were purchased at Kansas City and fed 100 days. The first 35 days they were fed only alfalfa ensilage, the second 35 days a little corn was added and the last 30 days 14 lbs. of corn per head daily with all the ensilage they would consume. When sold in Chicago they averaged 1050 lbs. This was an average daily gain of 2.25 lbs. per steer without any additional protein.

(F.S. Yetter)

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BROMEGRASS INSTEAD OF WEEDS: Martin Muecke, near Hinton, Iowa, in Plymouth County, several years ago seeded the roadside and fence-row along one side of his farm to bromegrass. This summer he harvested 420 lbs. of good clean bromegrass seed from the roadside area, 140 rods long and 20 feet wide. (Joe Colgan, Soil Conservation Service, Spencer, Iowa.)

111. BROME-ALFALFA GIVES A HIGH ACRE RETURN. (Cedar County, Tipton, Iowa.) (Page 94 in December, 1947, FORAGE NOTES.)

A. H. Baer of Tipton, Iowa, (Cedar County) purchased 23 medium quality steers weighing 675 lbs. per head at $20.50 in April. They were on a 25-acre brome-alfalfa field until October 23, when they were sold at $26.00 as feeders, averaging 900 lbs. In addition to the brome-alfalfa pasture the cattle had access to brome-alfalfa hay.

Mr. Baer also sold from this 25 acres 2 tons of baled hay per acre in late June at $20.00 per ton. The $40.00 hay crop and the $80.00 return from the beef gains, including the margin on the initial weight, gave Mr. Baer a gross return of $120 per acre. One steer died during the summer from an undetermined cause.

Very little power and labor were required for this enterprise, which pleased Mr. Baer, inasmuch as he is retiring on the farm and is anxious to reduce his work load to a minimum. Presently he has 60 acres of brome-alfalfa on the 120 acre farm. Baer plans to grow just enough corn in the future to renovate or reseed his brome-alfalfa fields, as necessary. Corn is being used to finish hogs pastured on brome-alfalfa. Mr. Baer wonders why he waited so long before starting his grassland farming program.

(Lewis A. Baer)

112. CAN IOWA PRODUCE ALFALFA SEED BY USING DDT? (Soil Conservation Service, Vinton, Iowa.) (Page 94 in December, 1947, FORAGE NOTES.)

A 15-acre alfalfa field produced 52 bushels of seed for Sam Raymond in Benton County near Garrison. The early spring growth was cut for hay and the second crop allowed to stand for a seed crop. With an average yield of 3.46 bushels per acre and a wholesale price of $25.00 a bushel, this amounts to a gross return of $86.50 per acre from the seed crop alone.

Two DDT sprayings were applied. The first spray went on when the second growth alfalfa was about 6 to 8 inches in height and the second when the first blooms were just beginning to open. The total cost of the DDT and application by a commercial spray company for both sprayings was $7.40 per acre.

The seed crop was mowed and windrowed about September 10. A combine with a pick-up attachment was used four days later. Small areas of the field were left unsprayed as check plots. These areas were estimated to have produced not more than half a bushel of seed per acre.

(Glenn F. Heady)

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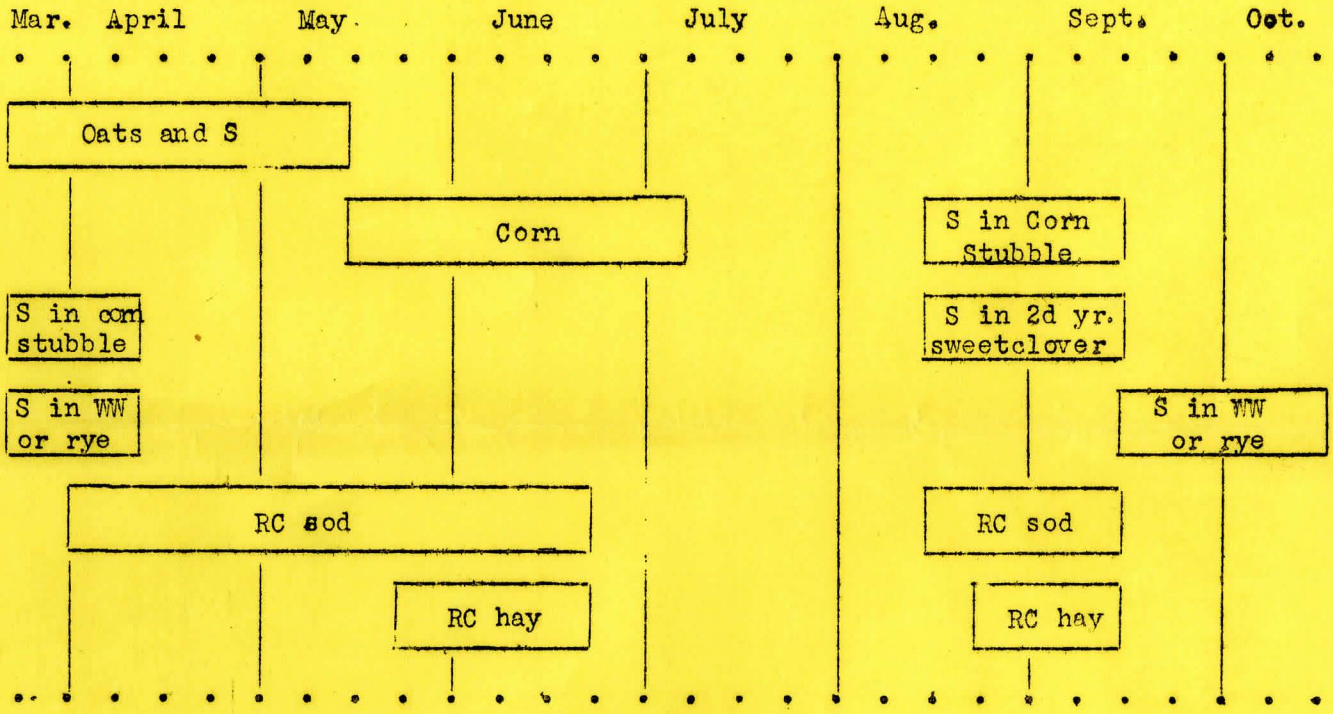
EDUCATION. I call education not that which is made up of shreds and patches of useful arts, but rather that which invocates principle, polishes taste, regulates temper, cultivates reason, subdues the passions, habituates to reflection, and trains to self denial - and more especially, that which refers all actions, feelings, sentiments, tastes, and passions to the love and fear of God -- Hannah More.

69. COMPARISON OF STABILIZING CROPS FOR GRASSED WATERWAY DEVELOPMENT. (Soil Conservation Service, Ames, Iowa.) (Pages 63-64 in August, 1948, FORAGE NOTES)

Studies were made on seven farms in Monona County, Iowa, in 1943 and 1944, to determine the most satisfactory stabilizing crops to use in waterways located in cultivated fields before seeding grasses and legumes.

From the results of this study, as well as other work on grassed waterway development the following seeding and vegetative calendar for waterway development, depending on conditions, is suggested.



S - Grass seeding; RC - Reed canarygrass; WW - Winter wheat.

The above chart suggests alternatives in establishing adapted perennial grasses in waterways in western Iowa. It has been observed that corn and bromegrass can be seeded together in May. If there is not a good stand of bromegrass when the corn is mowed in August it can be reseeded. When green reed canarygrass hay is used it should be spread to a depth of about one-half inch over the area of use and covered with two inches of moist soil so new plants will start from the joints.

Table 1. Comparison of Stabilizing Crops for Waterway Purposes
*(0 - None or poor; 5 - Very good)

Crop	Seeding rate	Seedling vigor*	Days to stabilize channel	Mid-season protection*	Weed control*	Fall seed-bed environment*	Competition with fall seeding*	Remarks
Oats	200#	5	13	3	3	4	0	Good, except doesn't control mid-summer annual weeds
Winter rye	200#	2	18	1	1	2	0	Annual weeds interfere with fall seeding. Does not afford protection
Sudan	50#	3	18	5	5	2	4	Sudan depleted soil of moisture, too dry for prompt germination of fall seeded grasses.
Atlas Sorgo	50#	2	21	4	5	2	3	Soil too dry for fall seeding.
Millet	60#	1	26	3	3	4	0	Root system affords little resistance to erosion.
Corn	150#	5	13	4	5	5	0	The most outstanding stabilizer.
Straw mulch	2½T. P/A	-	-	1	4	5	-	Affords protection only from rainfall, not from channel flow.

Summary and Conclusions

(1) In efficiency and effectiveness of stabilizing the waterway channel, corn broadcast or drilled at the rate of 3 to 4 bushels per acre between May 15 and July 7 was found superior.

(2) Unlike sudangrass and Atlas sorgo, when corn was mowed in August it was completely killed and did not compete with the fall seeded grasses. Corn roots and stubble protection carried over winter and well into following spring while grasses were becoming established.

(3) Diversion dykes were definitely beneficial and were found most practical means of protecting newly shaped channels until they could be stabilized with vegetation.

(4) In constructing dykes, low places must be avoided and suitable grade maintained.

(5) A stabilizing crop of corn is not recommended where satisfactory protection can be obtained from seeding grasses directly in newly shaped waterways.

(Maurice E. Heath)

1948
Mills County S. C. D.