

COOPERATIVE EXTENSION WORK
IN
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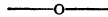
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BROOM CORN
in
OKLAHOMA

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Broom Corn in Oklahoma

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There is a widespread belief among farmers and business men in different sections of Oklahoma that broom corn is profitable and easy to grow as a cash crop. The purpose of this bulletin is to cover in some detail the necessary steps which must be observed if the crop is handled properly and to point out the precautions which should be taken. While it is true that broom corn often commands a high price per ton provided it is of high grade, yet the question of profit or loss must be judged by the production per acre rather than by the selling price per ton. It should also be borne in mind that there is a great disparity in price per ton, this difference running from \$350 for high grade whisk down to \$40 per ton or less for low grade corn and certainly there is considerably more medium grade corn produced than that of the high grade, due to many agencies, some of which will be discussed in the following pages. Since production has a great effect on price, the distribution and annual production should be studied. The following table shows the principal broom corn producing states for the past four years:

State	ACRES				TONS			
	1920	1921	1922	1923	1920	1921	1922	1923
Illinois	20,000	16,000	21,000	37,000	5,000	4,400	7,100	8,800
Missouri	3,500	3,000	3,000	4,000	800	900	800	1,000
Kansas	20,000	10,000	16,000	58,000	3,800	1,700	3,100	10,700
Texas	33,000	25,000	12,000	30,000	3,800	3,900	2,200	5,400
Oklahoma	178,000	146,000	195,000	271,000	19,200	23,000	19,500	29,800
New Mexico	14,000	13,000	11,000	50,000	2,600	2,600	1,500	6,400
Colorado	7,000	12,000	10,000	40,000	1,295	2,400	1,800	7,200

Since this bulletin deals with Oklahoma conditions, the following figures should be noted. These represent broom corn production in pounds by counties in Oklahoma, taken from the 1920 census.

Census Figures of Broom Corn Production in Oklahoma in 1919

Counties	Pounds	Counties	Pounds	Counties	Pounds
Adair	7,350	Coal	13,573	Greer	101,972
Alfalfa	1,650	Comanche	2,694,134	Harmon	3,427
Atoka	8,950	Cotton	242,640	Harper	546,628
Beaver	4,039,546	Craig	16,325	Haskell	500
Beckham	5,060,473	Creek	10,000	Hughes	27,450
Blaine	231,099	Custer	829,262	Jackson	12,000
Bryan	1,575	Delaware	2,030	Jefferson	33,460
Caddo	4,280,596	Dewey	1,608,200	Johnston	1,560
Canadian	51,125	Ellis	3,889,063	Kay	4,500
Carter	208,554	Garfield	500	Kingfisher	6,250
Choctaw	4,100	Garvin	11,418,524	Kiowa	685,536
Cimarron	689,452	Grady	8,021,877	Latimer	100
Cleveland	142,730	Grant	310	LeFlore	2,080

County	Pounds	County	Pounds	County	Pounds
Lincoln	4,950	Oklahoma	100,971	Seminole	34,796
McClain	7,661,155	Okmulgee	4,450	Sequoyah	1,362
McCurtain	41,699	Pawnee	48,769	Stephens	4,227,074
McIntosh	17,075	Payne	22,350	Texas	2,424,988
Major	2,059,151	Pittsburg	15,450	Tillman	39,568
Mayes	1,530	Pontotoc	33,870	Tulsa	4,000
Murray	88,590	Pottawatomie	52,088	Wagoner	1,200
Muskogee	8,614	Pushmataha	300	Washita	1,933,669
Noble	6,253	Roger Mills	6,090,988	Woods	913,839
Nowata	25,500	Rogers	3,160	Woodward	1,019,104
Okfuskee	6,401				

Description and Use

Broom corn is a member of the sorghum family, the head or brush of which is used in the manufacture of brooms and brushes. Because of this its value lies largely in the market value of the brush. The use of the brush is limited and the domestic supply almost entirely governs the price, only a few thousand tons being exported annually, while this amount is sometimes offset by the small amounts imported from foreign countries. The demand for brooms has remained fairly constant with the increase of population since the use of vacuum sweepers and other cleaning devices have supplied the increasing requirements for cleaning purposes. The demand is insistent each year in order to meet market needs and when the supply is scarce the price often rises to a high figure for good brush. Dwarf broom corn, after the brush is harvested, furnishes very good pasture for stock.

History

The origin of broom corn is not known. In Italy the growing of a sorghum with a loose open head for making clothes brushes dates back more than 300 years. It is very likely that broom corn has been produced from a sorghum of this sort through careful selection. Broom corn has been grown in the United States since about 1800. In the early agriculture of this country New York and Virginia led in the growing of this crop. It has been largely a new land crop and has moved slowly westward with the settlement of the states. During this spread only the Standard variety was grown. It has been only in recent years that the Dwarf variety has come into prominence due to its adaptation to dry weather and the semi-arid regions of the Southwest. A small territory in Illinois and the Lindsay district in Oklahoma represent the largest acreages of Standard broom corn while the Dwarf is confined largely to the semi-arid regions in the Southwest. Japanese Dwarf is largely confined to a small area around the Vici and Leedy districts of Oklahoma.

Climatic Adaptation

Broom corn may be grown over a wide range of territory but the profitability of the crop depends on a number of factors. Value of land and labor supply affects this crop value materially. It has been largely a new land crop and is similar to flax in that respect. As the land becomes higher in price it is displaced by crops of higher cash value except in favored areas where the farmers have made a specialty of the crop. It does best in a warm

sunny climate and is very drouth resistant, being much more so than corn. Good crops of broom corn are often produced with a very limited supply of water provided there has been enough moisture to insure a good uniform stand. A climate with cool nights affects the growth of broom corn and also affects the quality of brush and when grown under such conditions the brush is poor, having coarse, brittle, harsh fiber of poor quality.

Broom corn may be grown in almost every state. When the country was first settled New York was a heavy producer of broom corn. Later on Virginia, Ohio and other eastern states held the lead but reference to the preceding table will show the states which now produce the bulk of broom corn and have done so for a number of years. For profitable production, dry, sunny weather at harvest time is necessary for producing a bright green brush, rainy or damp weather causes red and weather stained brush.

Classification and Varieties

While there are many local names attached to strains or selections of broom corn there are probably three distinct classes. Seiglinger of the Woodward Field Station suggests the following classification: Standard, Dwarf, or Oklahoma Dwarf as it is known in the Southwest, and Japanese or Whisk Dwarf. These classes differ mainly in the height of plant.

The Standard variety makes up about two fifths of the total crop of the country. It grows from eight to fourteen feet and even sixteen feet high, depending on climate and soil fertility. The length of brush varies with the season and soil and thickness of planting and varies from fourteen to twenty-six inches and the head or brush is usually well exerted out of the upper leaf sheath or boot. The Standard is better adapted to humid conditions and requires more moisture as well as a more fertile soil to produce it since it grows more luxuriantly. The Standard grows much taller than the Dwarf and the brush is more firmly attached to the upper joint, which causes the head to be cut instead of pulled or jerked as in case of the Dwarf.

The handle or peduncle is longer in Standard which makes cutting practical as well as necessary. There are a number of strains of Standard grown but the two principal ones are the Black Spanish and the Tennessee Evergreen. There are distinct differences between these selections. The Black Spanish strain is valued mainly for its earliness and the fineness of fiber. It apparently produces a lighter tonnage than Tennessee Evergreen, but carries a better texture, according to growers. Farmers generally report that it costs more to harvest on account of a smaller brush. The stalks fall down badly and tangle and as a result makes handling harder. The stalk lacks in strength and the field damage is greater. Farmers report that it is generally ready for harvesting ten days ahead of the Tennessee Evergreen but probably produces a somewhat lighter tonnage due to fineness of brush. Estimates show that it probably costs \$10.00 per ton more to harvest Black Spanish than the Tennessee Evergreen. The market value of the brush is somewhat higher because of the quality of the fiber. The stalk of the Tennessee Evergreen is heavier and coarser and stands up longer in the field. The brush carries more length and more straws to the head. Many farmers re-

port that it stands drouth better than the Black Spanish and that the brush holds its color better than the Spanish. It apparently yields a slightly greater tonnage per acre.

The Dwarf variety is known under different names but characteristics are the same in all of the strains. The Oklahoma Dwarf is probably best known and most widely planted. The Acme, Evergreen Dwarf grown extensively around Elk City, and Scarbough Dwarf are also well known. The Scarbough produces an excellent fiber of good length when properly grown. The finer fiber of the Dwarf is used for whisk brooms and brushes and often commands a high price when the quality is good.

The Japanese or Whisk Dwarf is a distinct class or variety grown for its whisk brush value. It is noted for its high quality. It commands the highest price on the market but costs considerably more to handle because of the small head and light yield per acre. Its acreage is confined to small areas around Harmon and Vici in Woodward, Ellis and Dewey counties.

The Lindsay district comprising Garvin, Grady and McClain counties along the Washita river bottoms grows the Standard varieties almost entirely. A great deal of what is known as Dwarf territory grows Standard corn on its more fertile lands. Bottom lands where there is plenty of moisture and fertility are being limited and as it often happens because of seasonal conditions the other varieties produce a large percent of whisk brush. There is no justification for a greater acreage of this variety to be grown.

Sieglinger of the Woodward Station has carried on investigational work with broom corn in the Dwarf district for several years. This work is being done on very deep sandy upland and the following figures show comparison of varieties in yield per acre: Standard 331, Dwarf 392 and Whisk 392.

It is of interest to note that the same relationship holds true with the percentage of good brush produced by these varieties—Standard 80% good brush, Dwarf 88% good brush and Whisk 87% good brush.

Is Broom Corn a Profitable Crop?

With the exception of its forage value, the return per acre from broom corn is entirely from its marketable brush. Yield per acre, quality, market price and production costs all must be considered.

The average yield per acre of broom corn in Oklahoma is approximately 300 pounds. This means that it requires from six to seven acres to produce a ton of brush. Frequently much higher yields are secured where conditions are favorable but the average season will seldom produce much more. Neither is this production always first class brush. Broom corn is similar to the other sorghums in that the seed is low in vigor and germination is slow and often poor. As a result the stand is often poor and a poor stand of corn means a poor grade of brush. The effect of stand upon brush will be discussed later on. High tonnage prices often attract farmers to plant an acreage of broom corn without first considering the factors mentioned. A poor stand of corn not only affects the yield per acre but often cuts the price fully fifty per cent because of coarseness.

Figures secured from farmers all over the broom corn growing region

of Oklahoma indicate that but little broom corn is produced at a cost of less than \$100 per ton. Taking for granted that the price of good hurl brush is quoted at \$200 per ton, this leaves \$100 per ton or approximately \$15 per acre return for the farmer, provided he produces all first grade brush which is extremely questionable.

The farmer who grows broom corn successfully must study his soil and the kind of brush it produces at different rates of seeding in order to get the highest returns. He should also be in a broom corn growing community if he is to economize on labor and equipment.

Broom corn brush must be harvested quickly and placed under shelter for curing if the best prices are secured and for this reason requires plenty of help at the proper season. Floating labor follows the broom corn harvests each year which generally supply the needed help but do not reach territories isolated from the known broom corn districts.

It may be safely estimated that seventy-five per cent of the harvested brush will be first class provided that the stand has been good. Whether or not this seventy-five per cent will bring first grade price will depend on should be provided which are an item of cost to be considered. The general market price must finally be considered. The world broom corn market is constant and limited to an annual consumption of approximately 50,000 tons and when this tonnage is exceeded it has a bad effect on prices. Prices this year, 1924, have been greatly affected since the production has been around 75,000 tons. Such excess gluts the market and forces the producer to sell at a loss often regardless of high yields and economical production. Some returns may be expected from stalk pasturage, depending on variety. The Standard is of little value as pasture unless used at once as summer pasture. Producers figure it as worth fifty cents per acre. Dwarf corn is worth considerably more, growers renting it for \$2.00 to \$3.00 per acre generally for fall and winter pasture.

Growing the Crop

Generally the same treatment of soil and the same cultural methods apply to broom corn as applies to the grain sorghums and corn. It responds to good soil treatment and thorough ground preparation in winter and early spring followed by intelligent cultivation will yield good returns. A great deal of broom corn soil is prepared by listing. Too often the ground is only single listed before or at planting time. Blank listing in late fall and early winter to catch moisture, hold snow which falls and subject the soil to proper weathering is profitable. In the spring the ridges may be "busted" or relisted before planting time. Where surface planting is followed it is just as essential to observe fall and winter preparation.

Broom corn seed is similar to the rest of the sorghum family in that the seed often is of poor or weak viability. Germination is often low and poor stands often follow. There is no crop where it is of so much importance to have a uniform stand of crop in order to insure an even grade and right quality of fiber and length of brush at harvest time. The condition of the

soil at planting time is an equal factor with good seeding in insuring a uniform, even growing stand of broom corn. It will not germinate and grow off well in cold wet ground, neither should the ground be cloddy or poorly prepared as to fineness. In listed ground if ridges can be disked or harrowed down before relisting, it will materially aid in making a good seed bed. It can then be relisted for planting. When ground is flat broke, there is no reason for not having a well prepared seed bed. A great deal of broom corn in Oklahoma is grown in sandy soils and where ground is well handled and properly listed it makes a good seed bed and generally comes to a good stand if the seed is viable and the season is right. This brings up the question of seed and planting dates.

There has been very little work done toward definitely determining planting dates in the Standard district of Oklahoma, but the experience of growers has shown that from April 15 to May 15 brings best results as a rule. Many growers start April first and make planting through April and May in order to extend their harvesting operations over a longer period with better labor distribution.

The Woodward Station has found that in the Dwarf district of Oklahoma indications are that for early planting May 1 to May 15 may be considered best, while for later plantings, June 15 to July 1 is found to be best. No doubt the distribution of rainfall affects the planting date materially. In the first planting dates the crop has the benefit of winter moisture and that falling in the early spring, while in case of the late planting date the late summer rains will materially benefit. The following data shows results from planting at these dates:

Date	Yield	
	Good	Poor
May 1 to 15	420 lbs.	60 lbs.
June 15 to July 1	450 lbs.	66 lbs.

Seed

The question of seed should be of greater concern to broom corn growers all over the state. The matter of variety, that is, Standard or Dwarf, should be adhered to in their respective adapted localities and the strain of these varieties which growers have found to be most suitable to climatic conditions. For example: in the Standard district it is a common practice for farmers to plant Black Spanish Standard for early crop and follow with Evergreen Standard for later cutting in order to properly distribute labor. When variety has been settled the important thing to be observed is that of strongly viable, high germinating seed that has been well matured and well selected. Seed must also be well cleaned so that it will run freely through the planter plates. This factor is important in that the proper distribution and thickness of seed in the row depends on the uniformity of size and the extent that seed are cleaned of glumes and stems which often adhere in thrashing and grading. From the work done by various stations and seed growers there is good proof that any grower will profit from the use of seed that has been carefully selected and kept free of sports, mixtures, hybrids

and seed from poor brush. In fact, the grower of any considerable acreage will be justified in maintaining a seed plot where he may carefully rogue and maintain purity in type, variety and freedom from disease. A greater use of home grown seed should be followed since many fields are greatly affected in quality and tonnage through the use of poor seed. Lindsay district growers are generally fortunate in securing a high grade seed from Illinois growers who make seed production their business but this supply of quality seed is limited and too often unscrupulous dealers and growers get into the market and sell seed which is neither pure nor well prepared for planting purposes. Home grown seed has many advantages for the grower. He has more assurance of the reliability of the grower of the seed and often is able to secure seed with greater adaptation to his growing section.

The practice of using seed from thrashed brush which has been harvested for market should be strongly condemned since there is no assurance of the viability of this seed. Growers are rapidly learning this but it has been a source of loss to the grower who has been ill advised enough to secure his seed in this manner. The thrashed seed from market brush is of no use except that poultry or livestock may find some small value in it. Since it is green when thrashed, it generally heats and molds badly soon after it is piled up.*

Broom corn crosses readily with kafir, milo, Johnston grass, Sudan and other sorghums and care should be taken to avoid using seed from fields grown near such sorghums. This cross will not show up in the seed the year it is cross fertilized, but when such seed is planted the following year, it will show all kinds of heads and often mean a great loss to the growers. The writer saw several fields which were sown from apparently pure seed in 1923, but when it headed out not more than fifty per cent of the brush grew a true broom corn brush.

Smut in broom corn is very objectionable to broom manufacturers, and every precaution should be taken to prevent infection of fields or seeds. Both kernel and head smut are found in broom corn, but only the kernel smut is a serious factor with Oklahoma growers. Seed should always be treated against smut before planting. The treatment is inexpensive and effective if properly handled. Thrashers, planter boxes and other equipment may carry smut spores and therefore all equipment should be sterilized against smut infection.

Formalin Treatment for Kernel Smut

Mix 1 pound of commercial formalin with 30 gallons of water in a tub or barrel. Put the seed in sacks and soak in this solution for one hour, stirring it occasionally. Then drain the sacks and spread the seed on a clean floor or canvas to dry. Clean the floor or canvas and the sacks into which the seed is put with the solution. The seed will be infected again if untreated smut spores touch it.

The solution may also be used as a spray. In this case the seed may

*See Oklahoma Station Bulletin No. 135, A Chemical Study of Broom Corn and Broom Corn Silage.

be spread out and sprinkled with the solution and turned with a shovel until all of the seed is wet. Then cover with a canvas that has been treated. The canvas will keep in the fumes. Let stand over night and then spread out to dry.

Farmers often complain of poor results from treating seed for smut, but this is due in a large part to lack of care when the operation is done. The treatment is effective when properly applied.

Rate of Seeding and Spacing

Whatever seed is used, the planter box should be opened at each end of the row and the seed well stirred. This prevents chaff or stems from packing around the plates and affecting the stand.

The factors to be considered in the rate of seeding and spacing of plants are important. The yield of brush as well as the length of brush should be kept in mind. Rothgeb and Sieglinger found in their work at the Woodward Station that thick stands tend to produce short brush and thin stands produce long brush. Quoting from their report, "The fiber may be of good quality but too short or too long to be worked to good advantage in making brooms of average length. Hurl brush that ranges from 17 to 22 inches works to best advantage in manufacture of parlor and house brooms. Longer brush is required for heavy warehouse and street brooms, while short brush ranging from 12 to 16 inches in length is used for insides and covers to some extent." Their conclusions are that the length of brush varies in most cases with the different rates of seeding and varies also with seasonal conditions. Three rates of seeding were observed in the Woodward Station tests. Thick, average 4-5 inches; normal, 6-7 inches, and thin, 9-10 inches. Over a period of five years the following yields were obtained from this test:

Variety	Yield	
	Good Brush	Poor Brush
Standard:		
Thick	313	77
Normal	331	82
Thin	282	82
Dwarf:		
Thick	368	84
Normal	387	98
Thin	380	74

With both varieties the normal rate of seeding gave the highest yield of good brush with but little more of poor brush.

The following table taken from the Woodward Station results is also of interest in studying rate of seeding and spacing of plants:

Distance Between Hills	Average Yield, 5 Years	
	Good Brush	Poor Brush
4 to 5 inches	391	80
6 to 7 inches	430	68
9 to 10 inches	369	50
11 to 14 inches	396	54

*U. S. D. A. Bulletin No. 836, Broom Corn Experiments at Woodward, Oklahoma. Rothgeb and Sieglinger.

The conclusion from this study is that the thicker stands outyield the other rates in a favorable season and the thinner stands do best in dry years. The normal or intermediate rates produce fair to good yields of good quality brush in all seasons.

Equally interesting experiments in spacing and rate of seeding are as follows. In this test there were two plants to each hill.

Distance Between Hills	Average Yield	
	Good	Poor
2 to 3 inches, 5-year average	384	54
4 to 5 inches, 5-year average	279	42
5 to 6.5 inches, 5-year average	338	37
6 to 10 inches, 3-year average	259	32

Work along this line has been carried on very completely at the government station at Woodward and only the most applicable and outstanding results have been referred to in this discussion of rate of planting and spacing in the row. In conclusion, the best average spacing seems to be that of one plant in the hill and six or seven inches apart in ordinary rows three and one-half feet apart.

The above data applies to Dwarf sections of the state, while in the Lindsay country the rate of planting and spacing varies somewhat. The best growers in that section find that an average of eighty plants to the rod is best for the normal season. This will allow a bushel of seed to plant from eighteen to twenty acres.

In order to obtain a good stand at any stated rate a thicker seeding should be made since all of the seed will not grow. From two to three pounds will be sufficient to sow in most of the broom corn sections. Finally, the rate of seeding will depend considerably on available moisture and fertility of soil. On moist, rich soils the crop should be planted at a heavier rate than on poor soils with scant moisture supply.

Method of Planting

Planters should be calibrated before planting broom corn since in that manner the exact rate of seeding may be determined. It takes only a short time to determine the rate at which a planter is seeding. The machine may be blocked up off the ground so that the wheels turn freely and then by tying a string on the wheel and by placing a canvas on the ground to catch the seed, the revolutions may be counted. When the wheel has operated the planter for a sufficient time, the seed which has run through is weighed and the length in feet which the wheel has traveled should be measured. From these figures it is easy to compute the rate per acre at which the planter is dropping seed. The rate of seeding may also be determined approximately by throwing the planter in gear and driving it down the road or on ground where there is a hard surface. The distance between seed dropped may then be noted and in this way the planter may be checked fairly satisfactory.

When planting is under headway the seed should be stirred at each end of the row in order to insure free running seed. Unless seed is very clean chaff and small stems often settle and clog the plate. By stirring in this

manner this is prevented and skips in the row are avoided. It is a common practice to use an opener in the bottom of the lister furrow in order to provide a loose seed bed for the seed. This method is good when moisture permits.

Broom corn is either planted with an ordinary corn drill where surface planting is practiced or listed in with a lister drill, depending on the practice followed with other row crops in that locality. There is a great advantage to lister planting in sections where the soils are subject to blowing. Farmers follow the practice of listing "across the wind," which in Oklahoma will be east and west. The young plants in the lister furrow are protected from blowing sand and soil which often destroys crops which have been surface planted. The drill used should be fitted with special plates for planting broom corn. Implement houses generally have these in stock in broom corn sections. If not, blank plates may be drilled by a blacksmith for the purpose. When this is done the bottom side of the plate should be counter sunk to prevent clogging of the seeds. The holes should be three-sixteenths of an inch in diameter. The number of holes to make will depend on the speed adjustments of the drill.

Cultivation

The cultivation of broom corn should be the same as corn or sorghum in the same section. The principal purpose is to kill the weeds which compete for moisture and plant food. The young plants of broom corn grow very slowly at first and the crop will be seriously damaged if weeds are allowed to grow. It is essential for an even maturing crop that the plants have an opportunity to grow as rapidly as possible up to harvest time and weeds seriously interfere with this. When the field is full of weeds harvest is more tedious and expensive. Cultivation should begin as early as possible and followed often enough to destroy all weeds and grass and keep the soil in a loose condition. Crusting of the soil should be prevented, otherwise considerable moisture will be lost through run-off and evaporation. Beyond what cultivation is necessary to destroy weed growth and keep the surface soil in condition to absorb moisture, it probably will not be profitable.

Many weeds will be killed by good preparation of the ground and by disking and harrowing before planting. Rotation of crops will tend to eliminate weeds from the field and by observing these practices the amount of cultivation necessary may be reduced.

A spike-toothed harrow is an excellent implement to use in the early stages of growth where broom corn has been surface planted. Care must be used, however, for the stand may be impaired if the implement is too heavy. When a furrow opener is used the harrow may be used with entire safety. This should be followed by the ordinary cultivator.

Listed ground is generally handled with the go-devil, first throwing the dirt away from the row and killing the young growth of weeds and then following with cultivator to work down the lister ridges. It is a common practice to use the harrow to destroy weeds on the lister ridges and prevent crusting until the plants are large enough for the go-devil.

When to Harvest

The first question to decide in harvesting broom corn is at what stage of growth the brush should be pulled or cut. Two factors should be considered, color of brush and weight of brush. The brush should be harvested when the natural green color extends from the tip of the fiber to the base and center of the head. The center fiber should also carry a pea green color when ready to cut. This condition generally exists when brush is in full bloom to soft dough stage.

Farmers with large acreages are not always able to get all of their acreage handled at the best time in order to maintain high quality of color and fiber and for that reason acreage and labor supply should be adjusted accordingly. When the brush is harvested in the stage first described it is tough and flexible and carries the color most desired by manufacturers.

The Woodward Station has found that the following data obtains when brush is harvested in the three distinct stages:

Stage of Development	Green Brush Including Seed, Pounds	Cured Brush, Pounds	Cured Brush, Per Cent
Flower	309	79	25.6
Milk	209	59	28.2
Dough	441	142	32.2



Figure 1—Table Broom Corn

The results from these experiments indicate the best time to harvest in order to insure the highest yield of cured brush is in the dough stage. This Station is also carrying an experiment to determine the state at which brush may be harvested to insure the greatest wearing qualities. Indications so far are that the dough stage harvesting produces brush able to stand hardest usage. This Station also finds that brush harvested at earlier stages have weak fibers and break over the shoulders of the broom. When the farmer has an extensive acreage it is sometimes difficult to harvest all of the brush at the same stage of maturity. It is easy to determine when the color is right in the Standard but a large part of the brush of the dwarf varieties remains inclosed in the sheath. The base of the heads should be examined for the condition of the brush. When the crop is grown for seed the brush should not be harvested until the seed is fully mature. Ripe brush is of little value in making brooms but if handled well and is not discolored by wet weather it is worth about half as much as good brush. It should be baled and cared for the same as brush harvested when green.

Harvesting Standard Broom Corn

The Standard broom corn grows so tall that it must be broken over or tabled to bring the brush within reach so it may be cut off by the man harvesting the brush. In "tabling" the operator walks between two rows breaking the stalks about three feet from the ground bending them across to the opposite row forming a bridge which holds the heads in horizontal position extending out beyond each row. The brush is then harvested by walking in the space between rows and cutting the brush from the stalks about six inches from the knuckle. A broom corn knife or short blade is used.

After being cut the heads are laid on the tables in handfuls. From here they should be gathered, thrashed and placed on racks to cure as soon as possible. The best growers do this the same day the brush is harvested. This prevents any weather discoloration, which may lower the grade of the brush.

Considerable grading can be done in the field since there is always brush that is not profitable to harvest. All poorly developed, badly curled, crooks, "crook necks," or "sticks," and distinctly off type brush should be left in the field. Smutty brush should also be left as it affects the market grade of the bale in which it may appear. Goosenecks may be harvested provided they are separated and baled and sold as goosenecks. Often goosenecks contain excellent fiber which may be used when the crook is cut off.

Harvesting Dwarf Broom Corn

The Dwarf variety is much shorter in height than the Standard, being from three and one-half feet to five feet, and does not need tabling. The upper node parts more readily and the brush is pulled by hand rather than by cutting. It is generally placed in handfuls between the rows and allowed to cure for a short time and then either put into sheds for curing after thrashing or more often put into ricks for final curing. There is often damage to the brush when it is laid between the rows sometimes through

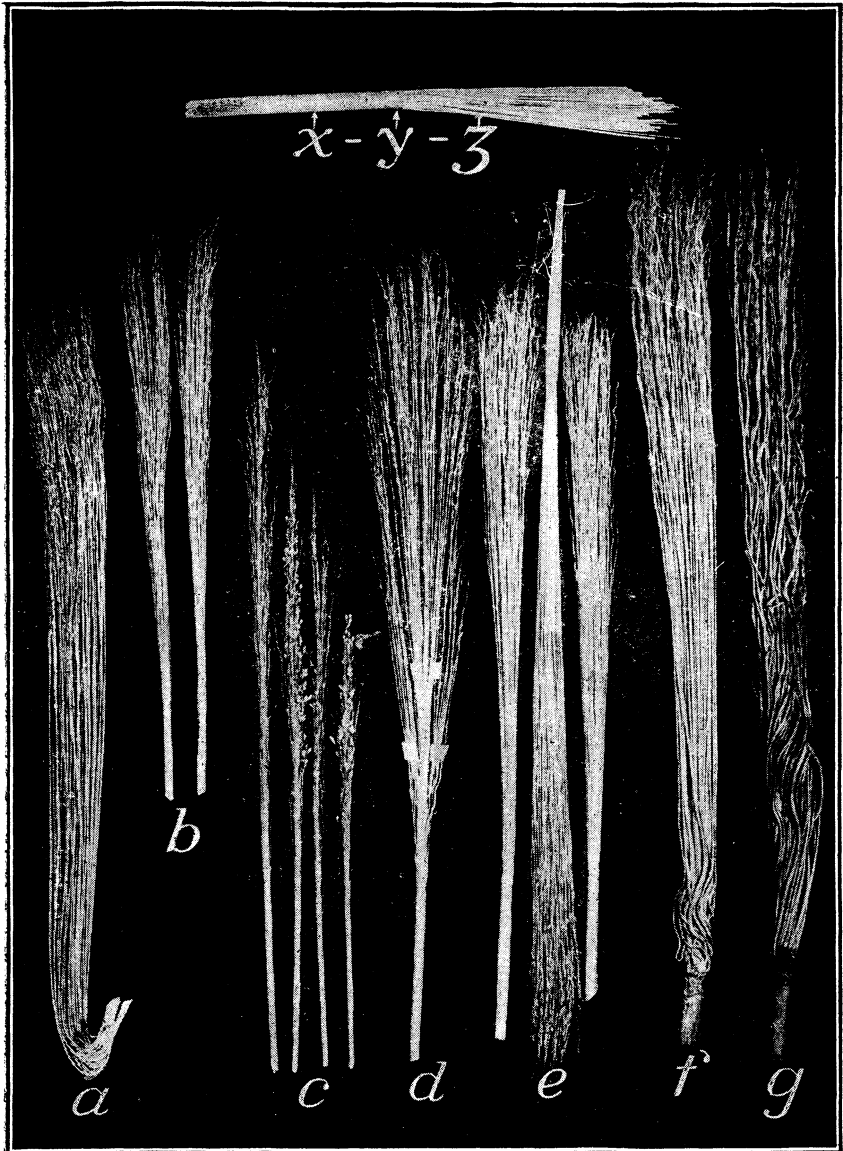


Figure 2—Different Types of Brush

contact with the ground or in taking poor shape. A better method is to break down the stalks as the brush is harvested and place the brush on top of the broken stalks. According to growers, who have followed both ways, this practice keeps the brush in better shape and condition. A large percent of the Dwarf corn is ricked for curing but the practice is becoming unpopular due to the damage from weather. Use of curing sheds is far more profitable.

The value of the brush is often determined in the curing process. For the brush to retain its fresh green color, rapid curing is desirable and it should not be exposed to strong sunlight, hence the value of getting the brush into shelter as soon as possible after cutting.

Handling the Brush

The brush is generally hauled to the thrasher on low rack wagons and laid in piles around the thrasher where it can be handled by the crew who carry it to the feeder of the machine. Economy of time is a big factor in these operations and since the brush can only be handled in small armfuls it is essential to use as much machinery as possible to save time. Some of the growers are using a special rack wagon on which the brush is gathered in the field and which can be dumped at the thrasher without being handled from the wagon. The following description and cut of the dump rack will give the grower a clear idea of how to build it.

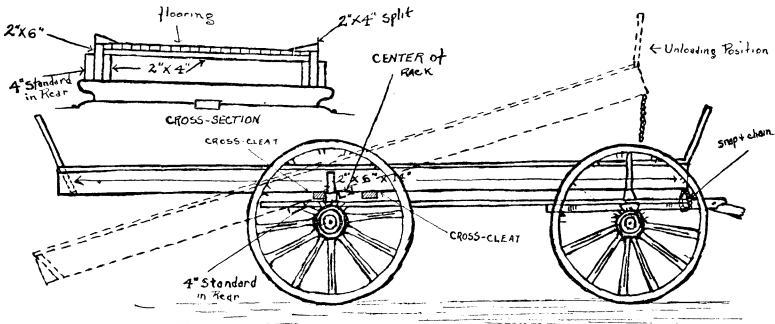


Figure 3—Dump Rack Wagon for Hauling Broom Corn

The rack may be built either fourteen or sixteen feet long using two pieces 2"x6"x14' or 16' according to length. Inside of the sills bolt 1x4's full length so that both pieces will set flush upon the bolster when placed in position. These pieces bolted together form the supports for the cross pieces upon which the floor of the rack is nailed. Use 2x4's for the cross pieces and use as many as needed to make the rack rigid. The rack should be floored with good quality narrow lumber for durability. This floor should be even and will wear smoothly and thus assist in dumping. Along the edge of the rack lay a triangular piece full length made by splitting a 2x4 or a 2x6. Wider lumber may be used if the rack is covered with tin so that the floor will not warp.

The front endgate is built solid to the rack. The rear endgate is movable. Nail two cross cleats on the bottom of the rack from ten to twelve inches to each side of the center of the rack. When the rack is placed on the wagon adjust the coupling pole so that the center of the rack will set about six inches inside of the rear bolster. Attach a chain and snap securely to the front end of the rack to be secured around the coupling pole in front to prevent the wagon from dumping in the field when passing over rough or uneven ground.

Load the wagon from the front laying the broom corn in even layers from each side. Upon arriving at the thrasher which should be at the curing shed, release the chain and shove the rack back on the bolster until the center of the rack passes the center of the rear bolster. With the wagon loaded evenly the load will be on a balance. Remove the rear endgate and the brush will slide onto the ground when the rack is tilted gently until it reaches the ground. By driving up the team the whole load will slide to the ground in layers while the rack will be held to the wagon when the cross cleat catches on the rear bolster. One man can easily shift the empty rack forward so that the center is again past the rear bolster and the rack can then be tilted into place. Snap down the front end and replace the rear endgate and the rack is ready for a second load. (Cut No. 3 illustrates plainly how this rack operates).

Thrashing

Care in this operation will be profitable. Often the thrasher and the grower himself hurries the operation and as a result the brush is left with a large per cent of seed which affects the selling price materially. The grower who leaves seed on brush to increase the weight of his corn figures unwisely for excess seed is objectionable to manufacturers for several reasons that the buyer always takes into consideration when he buys. Careless thrashing often destroys fiber by removing the fine fruiting branches which should be left if fiber is to be first class. If brush is left until it is cured or dry before it is thrashed, the teeth of the seeder always knocks off more of the tiny fruiting branches than if thrashed green.

These branches not only make weight in the bale or broom but are necessary in making a good sweeping, soft top broom. If the feeder is not careful the teeth on the feeder chain will break or kink the hurl at the place where the broom maker bends the hurl over the shoulder of the broom and a poor finish is the result of using corn damaged in this manner. Good seeding is often the result of care with the crew who handles the brush from the field. The ends should always be placed the same way from the time it is cut until it gets into the bale. If the ends are mixed the thrasher will tear up brush which are inserted in it. The butts of the brush should be kept even so that the thrasher teeth will clean the seed evenly and not leave occasional brush unseeded. Manufacturers report that they often find from twenty-five to fifty pounds of seed in a three hundred pound bale. This is a total loss to both the grower and the broom-maker since it costs him approximately \$25.00 per ton to remove and take care of the waste after de-

ducting cost of freight and payment of false weight caused by excess seed. It is estimated that an experienced buyer will lower the value of seed corn from one-third to one-half below clean seeded corn.

Curing and Shedding

A curing shed of some kind should be provided if broom corn is to be a regular crop. Some growers often build sheds near fields where the broom corn is grown while oftentimes barns, cattle sheds or any building which may be well ventilated is used for this purpose. Ricking is commonly practiced in the Dwarf district but it is so often a source of loss that it is not to be recommended to growers who wish to procure the best fiber each year. Sun dried brush is dry and harsh and not desirable from the manufacturer's standpoint and for that reason, brush should be placed in curing shape the day it is cut or pulled.

When sheds are used care must be taken to insure an even cure without mold or heat damage. Any broom corn will heat and shelf-burn if laid too thick. The most successful growers recommend that it be not more than four inches deep on the shelves. Where barns or partly closed sheds are used the layers should be thinner. A great deal of red speckled, black and crispy brush is caused by poor ventilation and uneven layers on the racks. It is necessary to watch the brush very closely during the curing period so that heating may be detected. The condition of the corn and weather conditions often affect the curing of the brush materially. It should be remembered that shelf burnt corn will cut the value one-third in price received.

Broom corn should be left on the slats until thoroughly dry. This may be anywhere from ten to fifteen days depending on weather and ventilation. When the butts of the brush will pop in two when bent it is ready for baling.

Rick curing is probably the next best practice although the color is not retained as well. These ricks are made narrow, placing the heads with tops

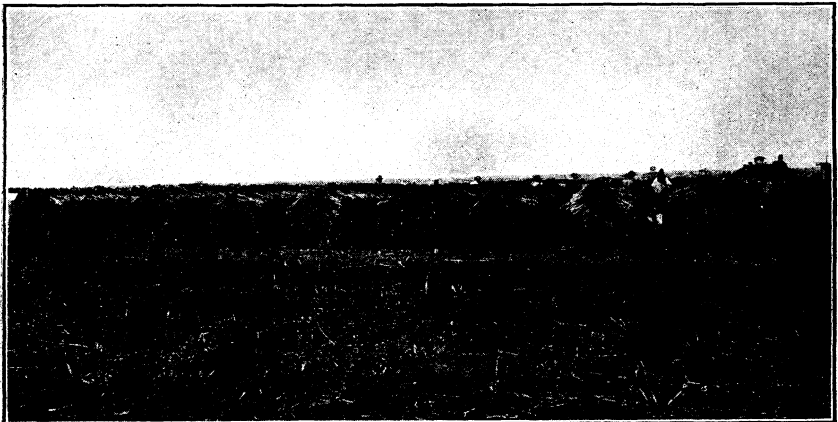


Figure 4—Rick Curing Broom Corn

out and butts in and lapping the middles. They should be from four to five feet high and long as convenient. Cover with broom corn stalks, sudan hay or any covering which will exclude water and prevent damage from weathering.

Some growers are reporting success from single ricking. Build this rick by placing three posts flat on the ground and use this as a base, building the rick slightly wider than the length of the broom corn so that the tips will lap over the butts when the layers are reversed. Stalks, lath or boards can be used between each layer of brush to help circulation and prevent molding. The rick may be built about five feet high and roofed with broom corn stalks, hay or any adequate protection. (Ricking not recommended as there is too often heavy loss).

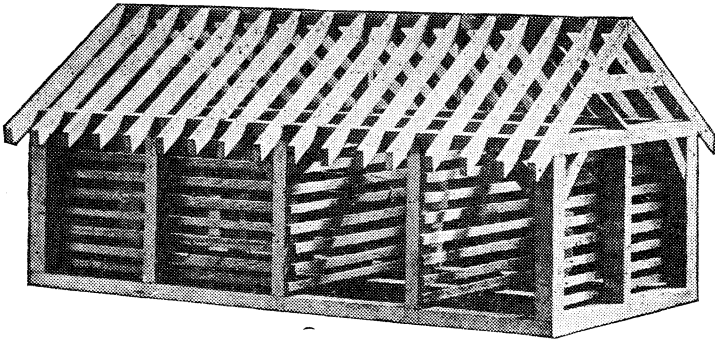


Figure 5—Shed for Curing Broom Corn Only

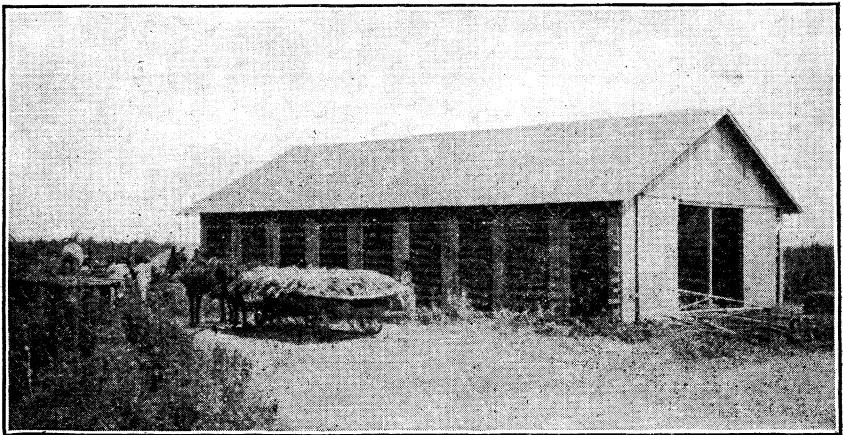


Figure 6—Common Type Curing Shed

Cut No. 6 shows a very common plan for shedding followed in the Standard district. A shed of this type is easily filled and is inexpensive.

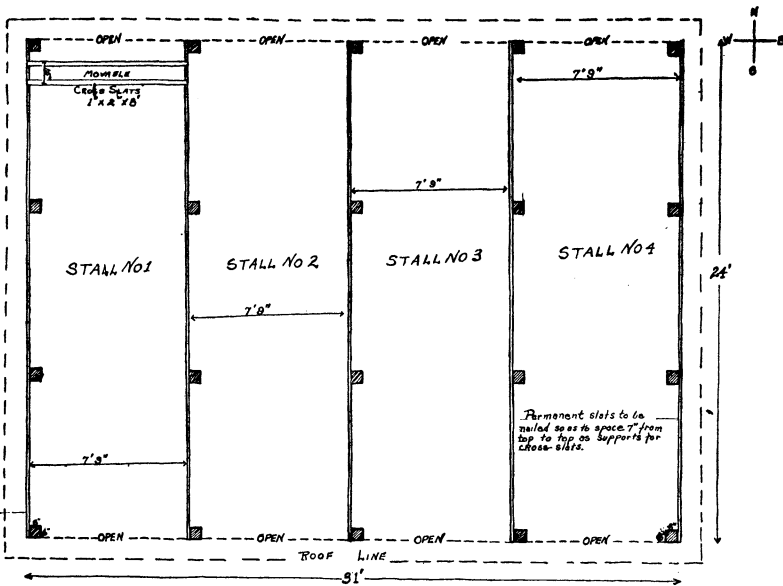


Figure 7—Floor Plan of Inexpensive Curing Shed

Cut No. 7 shows the ground plan of a curing shed advocated by C. C. Miller, Elk City, a prominent grower. It is described as follows: This shed is 24x31 feet with a height of 10 feet from the ground to the eaves. It will contain four stalls 7 feet 9 inches in width. Six-inch posts should be set firmly in the ground in order to make the shed substantial. Sides of the stalls should be slatted, leaving a space of seven inches from the top of one slat to the top of the next so as to leave a seven-inch space when the slats are in position.

These side slats should run the entire ten feet from the ground to the eaves. Do not try and use space above the eaves and near the roof on account of poor ventilation. By setting the end posts eight feet apart and the posts running along the sides 7' 9" apart the grower is able to use movable slats in each stall 1"x2"x8". These slats should be fully one inch in thickness and free from knots so that they will not break or bend under their load of brush. It will require 760 slats for the shed. The shed should be well braced to insure permanency. This type of shed will hold about six tons of broom corn.

Types of Broom Corn Sheds

Any type of shed may be used which will properly cure the brush. Cut No. 5 shows the construction of a shed holding four tons of broom corn. This shed is 16'x30'x8' from sill to eaves. The sills and plates are 2x6, corner posts 4x6, or 2x6 doubled with center posts 2x6. The shed contains four stalls running through the cross section of the shed or may be divided as

shown for better bracing. The sides of the stall are slatted with 1x4s, leaving seven inches space from top of one slat to top of next from sill to plate. Movable slats 1"x2"x8' are used for shelving the broom corn. It requires 650 of these movable slats for the entire shed.

The cost of this shed including slats is approximately \$250.00.

A very practical broom corn shed is being advocated by W. B. Hanly, county agent of Beaver county, Oklahoma, in the center of the Dwarf district. This shed may be made in any dimensions and is a combination live-stock barn and curing shed for broom corn.

The essential part of the plan is to have the sides of the building built in sections and hinged at the top under the eaves so that these sections may be raised at the time the brush is shedded and become a section of the roof to protect the brush. The building may be made nine or ten feet up to the square and siding should be ship lap or battled in order to be weather proof. This will be an advantage in adding protection for livestock when the building is used for that purpose. When the siding is raised it will furnish an additional shed room of approximately eight feet on each side of the building. Temporary supports are used for the sides while in use as a roof. The stalls for slats are put in temporarily and taken out after need for room is over. Part of the space may be utilized later for storing baled brush if needed. Such a building may be made to fit the livestock needs of the farm and at the same time care for broom corn curing in season. The cost of such a building need not be excessive. A suggested size would be 28 feet wide. Such a width will allow for 12-foot stalls for work stock and a 4-foot alleyway through the center. When used for a curing shed this width will provide for four 10-foot stalls with ventilating space and the center 4-foot alleyway. The length may be made according to the space needed.

Baling

When brush has been properly cured and thrashed, baling is the next step. Here again care will pay the grower since improper, careless baling often means a loss to the grower and others who may further handle the corn. First, it is not safe to bale corn that is wet or sappy for it will heat badly and will entail a heavy loss in selling.

The brush should be laid in the baler in small layers instead of armfuls. It should be butted down until all stalk ends are even. An uneven bale does not sell well, neither does a loose bale. The butts of one armful should be distributed in a layer at one end and followed in the same manner at the other end, alternating until the baler is full. A good square bale should be made of uniform grade of brush and should weigh from 300 to 400 pounds.

Bales should be firmly compressed in order to insure economical handling in cars. It is difficult to fill cars to the minimum weight if bales are not firm and well baled. A cross tie will help to hold wires on the bale, especially for the Dwarf brush. Growers should see to it that bales do not present a ragged appearance and they should be stored in a dry sheltered place and covered with canvas or other material to prevent the light from fading the outside of the bales.

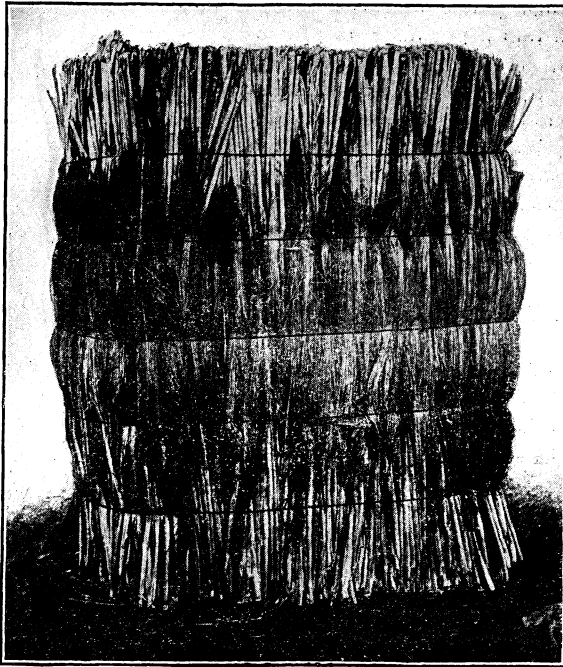


Figure 8—Well Baled Broom Corn

Grades and Markets

The marketing phase of any crop is very important in that the price received for it through the average of years determines whether the farmer can continue to grow this crop as part of his farm activities. The market quotations on broom corn and the price the farmer receives oftentimes are far apart for a number of reasons. It may be due to low quality of the brush or carelessness on the part of the farmer in curing and baling a neat, well tied bale. It may be due to a poor market since the farmer may be isolated from the centers where broom corn buyers congregate to buy the season's supply for the manufacturers. Cooperative marketing offers the farmer either isolated from local markets or otherwise, an opportunity to pool his corn and have it sold on its merits. If the farmer ships to a cooperative association he should produce in carload lots in order to ship economically since less than carload rates are very high and make it almost prohibitive to ship in smaller lots. Various factors of costs enter into broom corn marketing such as storage, insurance, freight charges, selling and grading costs regardless of whether it is handled by street buyers or shipped to a cooperative association.

Storage

If the farmer stores his brush on the farm and holds it for a future market, he will find it profitable to provide a dry shelter where brush will be protected from weather as well as sunlight. He may cover the bales with canvas or any such material or store in a dark place where the light does not penetrate too strongly. Bales which are faded on the outside do not attract the buyer as much as bright, green colored bales. Because of lack of proper farm storage it will generally be profitable to take advantage of storage facilities offered by the cooperative marketing association in its warehouse.

Insurance

When baled broom corn is stored on the farms it should be insured against loss by fire. Because of lack of care in certifying to actual contents when the insurance is placed, the rate for such insurance is very high and few farmers avail themselves of the service. When such insurance is placed on baled corn in storage, the farmer should have a correct estimate made of the weight and grade by a competent broom corn man. Such a practice will avoid much controversy in settlement and would ultimately lead to a cheaper rate of insurance. Authorities state that the rate at present is unnecessarily high compared to the fire hazard. The man who wants to exploit the insurance company often is able to do it, but the honest farmer pays for it in high insurance rates.

Grades

There have been a number of grade systems advocated for broom corn but none have been officially adopted by the U. S. Department of Agriculture. Manufacturers have had their own standards and have gone into the field and purchased their needs accordingly. The following grade terms are in common use among broom corn speculators and traders: fancy, good, medium, common, fancy carpet, carpet, parlor, warehouse, junk. These terms are applied to different grades of corn as the trader or manufacturer buys them. The fallacy of these terms is that very few understand them to mean identically the same, hence many merchants have different standards of corn. The same differences have applied to the trade terms describing qualities or condition of brush.

The following is a list of terms and definitions now in common use by the trade.

How to Measure Terms and Definitions

How to Measure Fiber.—All fiber must be measured from last knuckle.

Fiber means the straw.

Hurl.—Hurl is fiber more than fifteen inches in length.

Covers or Turnovers.—Fiber ranging from ten to sixteen inches.

Insides.—Is any fiber shorter than covers.

Carpet Fiber.—Is any fine fiber; by fine fiber is meant small, thin, round fiber.

Parlor Fiber.—Is medium fiber, includes larger round fiber and small flat fiber.

Warehouse.—Means any coarse, heavy round or flat fiber.

Whisk.—Means any short, fine, smooth fiber.

Metal Case.—Is short, heavy fiber, may be rough, burly, curly and wavy; metal case is used as insides and covers.

Color.—Pea green, green, pale green, red tinge, red splashed, red at knuckle, red at boot, red tip, sunburned, premature rainstained at knuckle, black, pale bleached and smut.

Knuckle.—Is where fiber joins the stalk.

Center Stem.—Is a large stem through the center.

Second Growth.—Heads containing two or more joints or knuckles.

Treetops.—Heads composed of a number of stems.

Spikes.—Short stubby straw around a center stem.

Bony.—A stalk running through the whole head, with a number of points.

Muletail.—A long handle with a short bunch of straw at the end.

Corkscrew.—A head in the shape of a corkscrew.

Crooks.—Heads that have turned down at knuckle.

Gooseneck.—Same as crooks.

Tip.—The end of the fiber.

Plumtip.—Where the fiber grows out even to the end.

Peaked tip.—Fiber uneven at the end.

Wavy Tip.—Tip that is wavy.

Rough Tip.—A tip that is burly coarse and wavy.

Blasted Tip.—Where adverse climatic conditions cause blasting of seed before harvest.

Brittle.—Any fiber that has no elasticity.

Damaged.—Any unnatural defect.

Rotten.—Decomposition.

Certain other trade terms may be defined as follows:

Insides.—Shorter corn used for making the inside of the broom, sometimes called handle corn as it is the first corn tied to the handle.

Covers and Turnovers.—Longer and better fiber and quality than insides and used to cover insides and make the shoulder of the broom.

G. B. Alguire of the U. S. Department of Agriculture has done considerable work in studying broom corn in order to adopt a system of grades which will be workable and practical for the grower and manufacturer. As a result of these investigations the following tentative system of describing the qualities of broom corn has been devised. This is not in any way official and has simply been proposed by the Department for consideration.

Suggested Qualities of Broom Corn

(The quality of each stalk in sample is determined on its own merits and the percentage of each quality in sample is determined therefrom).

"A" Quality Broom Corn.

Shall be green or greenish yellow, fine brush and shall be free from all color and fiber defects except that it may contain in slight degree sun-bleach, red and wavy boot, immature brush and sun-scald.

"A" Quality Hurl. Shall be "A" quality broom corn which for at least 17 inches from the clip shall be free from all color and fiber defects except that it may contain slight sun-bleach.

"A" Quality Underwork shall be "A" quality broom corn which does not cover the requirements of "A" Quality Hurl.

"B" Quality Broom Corn.

Shall be green, greenish yellow, or yellow, fine or medium brush and may contain in medium degree, defects permitted in quality "A" and defects in medium degree of red or wavy fiber, stain, mold and kinky tip.

"B" Quality Hurl shall be "B" quality broom corn which for at least 17 inches from the clip shall be free from red or wavy fiber, and from stain, mold or kinky tip in medium degree.

"B" Quality Underwork shall be "B" quality broom corn which does not cover the requirements of "B" Quality Hurl.

"C" Quality Broom Corn.

May be any natural growth color, fine, medium, or coarse brush and shall be free from severe burn, and spikes or burley growth but may contain in severe degree, defects permitted in qualities "A" and "B" and may have jointed or flat brush, cork screws or tree-tops.

"C" Quality Hurl. Shall be "C" quality broom corn which for at least 17 inches from the clip shall be free from severe red or wavy fiber, jointed or flat brush, cork screws, and tree-tops.

"C" Quality Underwork shall be "C" quality broom corn which does not cover the requirements of "C" Quality Hurl.

"D" Quality Broom Corn.

Shall be broom corn which does not meet the requirements for qualities "A", "B" or "C" Underwork or which is of a distinctly low quality.

Definitions

(Abridged)

The following definitions which accompany the descriptions of suggested qualities are shown here so that the farmer may know more of the factors which enter into the grading and marketing of broom corn fiber.

Broom Corn is a term applied to the growing crop, also to the "brush" or "stalk" or that part of the plant consisting of the "stem", "knuckle" and "fiber" which is used in the manufacture of brooms and brushes. The term "broom corn" in these suggested standards, however, will apply only to the brush or stalk.

Basis of Determination. Each determination of dockage shall be upon the basis of the broom corn including the dockage. All other determinations shall be upon the basis of the broom corn free from dockage.

Percentages. All percentages in grading broom corn, except where otherwise stated, shall be by weight. Percentages of length and quality are stated in the nearest multiple of ten. Fractions of one per cent shall be ignored.

Dockage. Dockage shall include any other material than broom corn and such portions of the broom corn plant as seed, boots and excess stems. When the percentage of dockage is less than 5 per cent it shall not be stated. When the percentage is 5 per cent or a multiple thereof it shall be stated and

added to the grade designation. When not a multiple of 5 per cent it shall be stated as the next lower multiple of 5 per cent.

Texture. The measure of diameter of fiber shall be determined on a "stemmer" of proper gauge one-fourth the length of the fiber from the knuckle and the percentages estimated on the relative quantities of fiber so separated to the total amount of brush.

Fine Brush shall be that in which not over 5 per cent of the fiber exclusive of center stems gauges over 1-16 inch.

Medium Brush shall be that which does not meet the requirements of fine and in which not over 20 per cent of the fiber, exclusive of center stem, gauges over 1-16 inch.

Coarse Brush shall be that which does not meet the requirements for medium and in which not over 50 per cent of the fiber, exclusive of center stems, gauges 1-16 inch.

Flat Brush shall be that in which over 50 per cent of the fiber gauges over 1-16 inch.

Length. Length of brush shall be the distance in inches from the knuckle to the "clip", the clip being the end of the brush after trimming. Length shall be indicated by four classes as follows:

Short Brush shall be 10 inches or over and less than 14 inches in length.

Medium Brush shall be 14 inches or over and less than 17 inches in length.

Long Brush shall be 17 inches or over and less than 23 inches in length.

Overlength Brush shall be 23 inches or over in length.

The above data on trade terms and definitions are given so that the farmer may familiarize himself with the various trade terms, the classes that are now used by the trade and compare with the system which may ultimately be adopted. At any rate it will be of value in understanding any system which may become standard.

Heretofore the question of grades has not been of interest to the trade in general since each manufacturer had his requirements and buyers in the field were able to fill them, but the producer often suffered financial loss in the process in not knowing the grade and value of the brush he was selling. Since the establishment of cooperative marketing associations the need of grades from the producer's standpoint has been greatly emphasized.

Marketing Broom Corn

The marketing of broom corn in the past has been largely carried on by independent buyer, broker, and commission agencies. Until the last two or three years the growers of broom corn were largely dependent upon their nearness to the local market, and the number of buyers who bid upon their crop. Broom corn growing districts showed sharp contrast in prices paid and for the most part the grower had very little or no knowledge of the quality of the crop he produced. Sale was largely a trading proposition based entirely upon the best bargain to be driven.

On this basis an elaborate system of buyers, speculators, strongholders, brokers, and commission buyers arose between the producer and the con-

sumer. Crops when handled through a number of intermediary agencies must expect to have the handling charges added. The result was that the product in the original purchase had to be purchased cheaply and before it reached the consumer it had to be sold high to clear the expense of passing through many hands.

To the farmer the condition was generally unsatisfactory. With the growth of co-operative marketing, broom corn growers viewed some such plan for several years before steps were actually taken. The first cooperative was a local warehouse association, owned and controlled by farmers at Portales, New Mexico. Today we have the Broom Corn Growers' Cooperative Association, the national organization, two state organizations in Texas, one in New Mexico, while steps have been taken toward organizations in Idaho, Missouri and Illinois.

Through the cooperative marketing medium the growers have the advantage of collectively studying their crop. Exchange of ideas are most easily made through active organization. In the past the broom corn grower seldom knew much, if anything, about the grade, quality, or use of the brush which he grew. Through the national organization broom corn is pooled on grades and these grades with full description are the common property of each member. Through this organization he has been in a better position to bring his needs of a standard grading system to the attention of the Department of Agriculture with the result that the matter has been given considerable impetus at Washington and a tentative plan has just been issued by the department. The day of standard grades for broom corn would seem to be not very far distant. In addition to this the broom corn industry faces a limited consumption of approximately 50,000 tons. Knowledge of the needs and possible demand for the crop is of great importance to the grower if he is to gauge his planting to fit possible needs. It is recommended that the broom corn grower diversify his crops and make his individual acreage consistent with the fairly limited outlet for the community at the present time. It has been found that growers who receive the greatest financial benefit from broom corn planted less acreage and cared for it painstakingly, properly curing, seeding, and baling it. Until such time that steps may be taken through organization to increase the outlet or demand for broom corn the growers need to keep in mind the 50,000 ton annual demand.

As pertains the actual marketing of broom corn, the product lends itself admirably to cooperative marketing. It is not perishable and will keep indefinitely if properly stored. The product has a fair value in most years and it can be financed easily in periods of over-production. The goal of cooperative marketing would provide for the storage of that portion of the crop above the demand until there is a demand for it, thus preventing the dumping of unneeded surpluses on the market to depress the value of that portion of the crop actually needed. Speculators in all farm products take advantage of withholding surpluses from the market but not until they have used them to depress the farmer market and get the crops into other hands. The unstable financial condition of the farmer compelled him to dump, while through lack of knowledge of the demand he produced in quality and amounts

unfitted to the market. Organization must overcome these ills together with the cooperation of the farmer himself.

Actual marketing of broom corn to be successful must place the broom corn to be marketed at the centers of consumption in order to bring the highest market price. Cooperative marketing emphasizes the necessity of having the broom corn for sale at the right place at the right time. From a sales standpoint cooperatives of any kind will be successful in proportion to their ability to do this. Such sales contact can not be builded up within a short time. Like other business endeavors it takes time. Cooperative marketing agencies are new and while accomplishing a tremendous result in the matter of narrowing buyer margins and compelling more direct sale from producer to consumer, are at the best yet in their infancy.

Perhaps the two most meritorious criticisms of cooperative marketing are those of "delayed payments" and "encouraging over-production". Delayed payments and the hardship they work upon the farmer is not an ill of cooperative marketing, it is but a forceful reminder of the precarious condition in which agriculture now finds itself. To do away with cooperative marketing because of the necessity of deferred payments would be doing away with the agency that has done more toward narrowing margins in trading in farm commodities than any other thing in the history of American agriculture. When margins are narrowed, the producer receives a better price. So it would be interesting if we could really know just what the price would be without the "coop" in any definite field like broom corn. It has been pointed out that the advances which the cooperatives make would probably equal the net price without them. So deferred payments in that case would be in the light of dividends. But be that as it may, cooperatives with deferred payments hold tremendous possibilities for agriculture, while agriculture without cooperatives faces less financial stability than ever before for the farmer. Inability to await deferred payments shows clearly the dangerous ground on which the American farmer finds himself financially. Some hardship must be expected in getting away from such a condition.

That cooperatives encourage over-production would seem to be true especially in the case of broom corn. Producing approximately 81,000 tons in 1923 the broom corn farmers followed with a large crop in 1924 with the result that there is a heavy over-production. It might be pointed out that the publicity given broom corn and the methods in producing it and preparing it for the market as well as the good prices received in 1923 in face of a big crop would prove that cooperatives in this case have caused a tremendous over-production. If such an over-production above the normal demands has been brought about, it must of course suffer in consequence. But such occurrences will grow less and less likely as time goes on and cooperatives become older and its members better acquainted with the needs of the industry yearly and the effects of growing a crop too much out of proportion to the possible demand. While at the same time organization will in time bring about increased demand with the building up of other markets. Foreign markets seem to offer a hitherto unworked field. The broom, an American necessity, may well become a necessity to other nations of the earth. It is

a field that has not been worked while we in America stand in the ridiculous position of importing the small crops of Australia and Hungary into this country for consumption while our farmers are struggling for a market for their product that will bring a fair livelihood.

Other ills of lesser nature have been held up as criticisms for cooperative organizations. Inefficient management, inability of farmers to organize and function successfully, contract violations, etc. In broom corn marketing ills of this kind are to be expected as much as in any other cooperative marketing agency. These ills are largely ills of infancy for it must be remembered that cooperative organizations are comparatively young while handling tremendous volumes of business in many cases. With time they will not only establish themselves as business enterprises but their executives of tomorrow will be the sons (and perhaps daughters) of farmers who have been trained for their special tasks in the best schools of our nation. Along with better management will come a better understanding of the business of farming in its larger aspects of marketing which will do more than any other one agency to regulate sanely the production of various crops, and to appreciate the benefits of cooperative marketing. It would seem in conclusion to be a gigantic task in which all stand in need of much deep study with the knowledge that the principle of cooperative marketing has been pronounced sound by economists and other authorities.

