

COTTON A COMMUNITY CROP

One-Variety Communities Must be Recognized as the Basis of Production, in Order to Preserve and Utilize Superior Varieties of Cotton

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ORGANIZATION may be desirable with any crop, but cotton has a special community feature, the product of many farms going to the same gin. The cotton industry should have been placed on a community basis when public gins supplanted the former system of private or plantation gins, but methods changed gradually and consequences were not considered. Ginning is done with less labor by the modern high-power equipment, but the public gin system has made it very difficult to keep seed pure, or to have superior varieties in general cultivation.

CONSEQUENCES OF THE PUBLIC GIN SYSTEM

Improvement of varieties was more feasible under the old system of private gins because the careful planter could maintain uniform strains of cotton, by selecting the best individual plants, isolating their progenies, keeping the seed separate, and furnishing pure seed to stock other plantations, as the custom was. Present-day farmers very seldom practice individual plant selection, or maintain stocks of pure seed. Different kinds of cotton are grown in the same communities, the seed is mixed at the public gins, crossing takes place in the fields, and degeneration ensues.

According to the general testimony of the cotton trade there has been a serious deterioration in the quality of the American cotton crop in recent decades, which can be understood when account is taken of the effects of mixing and crossing different varieties, and the general use of ordinary "gin-run" seed for planting. The system of plantation gins survived longer in the Sea Island districts of the Southeastern States and the lower Mississippi Valley, so that the

long-staple branch of the industry remained on a somewhat better footing until recent years. But with the boll-weevil invasion the dominance of short staple varieties and of the public gin system became complete.

Though it would be considered foolish for a large grower having a private gin to plant several varieties and allow them to become mixed, this is essentially the procedure that is followed by members of cotton-growing communities. It is true that communities seldom own gins, but gins are supported by communities, and ginners as well as farmers would profit through improvement in yield, quality and market value of the crop. Better ginning could be done, and with less difficulty, if only one variety were handled, instead of many kinds.

DETERIORATION OF VARIETIES THROUGH CROSSING

The idea formerly entertained, that cotton is not cross-pollinated, or that crossing is very infrequent and not of practical importance in relation to seed-supplies, has proved to be erroneous. Cotton pollen is not blown by the wind, because the grains are sticky and adherent, but is carried regularly by bees or other insects that visit the flowers, so that varieties growing in neighboring fields are cross-pollinated, in addition to the general crossing that takes place in fields where mixed seed is planted. No matter how good the original varieties may have been, a mixed stock becomes, in a few generations, thoroughly miscellaneous and mongrelized, with many abnormal and infertile plants, very inferior to the parental types.

The degeneration that results from crossing no doubt is the basis of the

popular idea that cotton varieties "run out" in a few years, and that "fresh seed" must be brought in from other districts. But the fact is that locally selected seed of good varieties has proved better than imported seed, when careful comparisons have been made. Moreover, some of the best known varieties have been grown continuously in the same districts for many years, with no indication of "running out," as long as isolation and selection are maintained.

A system like ours, that mixes different varieties together and uses inferior, mongrel seed as the basis of production, no doubt would be considered very backward if discovered in a foreign country. Chinese farmers might be excused on the ground of having no select varieties to plant, whereas American farmers, although they have had superior varieties developed, have not learned how to maintain and utilize pure stocks of seed. In this respect our system must be considered defective and wasteful, not only to the farmer and the manufacturer, but to all who use cotton for any purpose that requires strong or durable fabrics.

EXTENT OF PURE SEED REQUIREMENTS

Full utilization of superior varieties is possible only in one-variety communities, since it is only in such communities that select, uniform stocks can be maintained and increased. The varieties are not fully utilized unless they serve as the basis of crop production over large areas, and for many years. Utilization does not begin until a variety is represented by enough pure seed to plant a field of cotton, and the requirement of pure seed is still the same when the culture of the variety extends over millions of acres. It is not sufficient that an improved variety be adopted by many individual farmers scattered in mixed communities, because this does not provide an adequate and continued supply of pure seed.

There is no prospect of centralizing the production of cotton seed in a few communities or districts for supplying the entire industry. A vast quantity of seed, more than 500,000 tons, is

needed for planting the American cotton crop, whereas only about 30,000 tons are handled by seed-dealers. On account of the relatively large size of the seeds, the limited number produced on a plant, the need of heavy seeding, and the holding of reserves for replanting, about ten per cent of the entire crop must be of planting quality to afford a general provision of good seed. The cost of transporting the entire volume of seed would be enormous, in addition to the danger to the whole industry through distributing insect pests or plant diseases, or through failures of crops in seed-supply districts.

THE SOCIAL FACTOR IN UTILIZATION OF VARIETIES

If the utilization of varieties depended upon finding a new chemical to treat the seed or to fertilize the soil, or upon devising a new machine for planting, cultivating or harvesting the crop, the problem would appear normal, and a solution could be sought along the usual technical lines, but social factors enter the reckoning when it is understood that *superior varieties of cotton can be utilized only as they are preserved in one-variety communities*. Except through community action there seems to be no approach to a general application of the science of heredity or the art of plant-breeding in the improvement of the cotton industry.

That pure seed problems should be considered by sociologists is as little to be expected as that plant breeders should study community organization, but a common ground is reached when the practical needs are recognized. Breeders should value community co-operation, while sociologists and economists, as well as teachers and agricultural leaders generally, should take more account of the biological factors that determine the improvement or degeneration of varieties. To devise effective methods of organizing and conducting the activities of one-variety communities, in growing, handling and marketing the crop, and in maintaining the purity and uniformity of the basic stocks, are problems of as much practical importance as the original dis-

covery or breeding of the varieties, and equally worthy of careful, scientific study.

The problems of cooperation are the field of research that needs most to be cultivated at the present time, for the general welfare of the cotton industry. The technical problems, the breeding of superior varieties, and the spinning and weaving of cotton by machinery, are much farther advanced than the general commercial problems of handling, transporting and distributing, which react directly upon production. On account of the present scarcity and acute demand for good fiber, the manufacturing and commercial interests are recognizing the need of research, but without understanding that improved systems of buying and handling the crop are as necessary as improved varieties. Not only facts regarding varieties and textile qualities of different kinds of fiber, need to be investigated, but the whole field of activities that lies between the breeding of varieties and the manufacturing processes.

ENORMOUS WASTE OF PRESENT SYSTEM

The damage to the industry that results every year from the lack of good seed and the resulting failure to utilize fully the resources of production must be estimated in the hundreds of millions of dollars. Replacement of our present inferior, mixed stocks by superior, uniform varieties would give a direct gain of at least ten per cent in quality, and as much more in yield, while another ten per cent might be expected from the cultural improvements that become possible in one-variety communities. Advantages from community handling and marketing of a standardized product would not be less important than the other items, and pure seed can be sold above the oil-mill prices. In returns to the farmer, our present unorganized production may have only a fifty per cent efficiency as compared with what may be found possible in well organized one-variety communities. The general waste of labor and resources of production in the eastern cotton belt contrasts painfully with the one-variety communities

of the Salt River Valley of Arizona where the Pima variety of Egyptian cotton is grown exclusively, and the advantages of community organization are beginning to be realized.

ONE-VARIETY COMMUNITIES MORE PROGRESSIVE

Cultural problems are simplified in one-variety communities. Effects of different conditions of soils, seasons, and cultural methods are learned, instead of being confused with differences in the characters of the varieties. The most rapid progress in cotton culture is now being made in the Salt River Valley of Arizona, where only the Pima variety is grown. Cotton problems are discussed with interest and profit at farmers' meetings because everybody has had experience with the same variety of cotton. Such progress is not possible in communities where different kinds of cotton are planted and farmers ascribe their success or failure to the seed.

With adequate understanding of the behavior of one variety, methods are adjusted more closely to differences of soil, season and time of planting, and labor is applied to the best advantage in farm operations, preparing the land, planting the seed, thinning and spacing of the plants in the rows, cultivating, irrigating, harvesting and handling the crop. In weevil-infested regions it is especially important that all the farmers of a community grow the same variety, plant as nearly as possible at the same time, handle the crop together, and clear the fields early in the fall. One-variety communities develop skill, while mixed communities suffer from backward cultural methods as well as from deterioration of varieties.

MARKETING A STANDARDIZED PRODUCT

The final advantage of one-variety communities is in marketing the crop. In an unorganized community the farmer who raises better cotton than his neighbors usually is forced to sell it at the same price to the local buyer. The manufacturer pays more for the high-quality fiber, but the difference is absorbed by the buying trade, instead

of being shared with the farmer. The more valuable bales contribute to the profit of buying and sorting over the miscellaneous "hog-round lots" accumulated by local buyers, many of whom do not know how to "class" the cotton.

Failure to give the farmer practical encouragement in his effort to improve the crop is a serious defect of the present commercial system, but organized communities have a standardized product, better than any of the "even-running lots" that can be made by sorting and matching the inferior fiber of mixed communities so that the commercial problems are simplified. Even in advance of formal organization of communities, a distinct advantage may be shown as the one-variety condition is approached. The general popularity of the big-boll type of cotton in Texas has kept the crop more uniform and given that State an appreciable market advantage in comparison with other parts of the cotton belt. Premiums of \$10 to \$20 per bale, are being paid in Texas and Oklahoma communities because so many of the farmers grow the Lone Star or Acala varieties that buyers compete for the superior fiber. Active campaigns for community standardization and marketing are in progress in Texas, Oklahoma and North Carolina.¹

COMMUNITY CHOICE OF ONE VARIETY

No doubt it will be difficult and sometimes impossible to get farmers to agree upon one variety as the best for their community, though too much may be made of this obstacle. Even a poor variety will give better results with community handling than good varieties mixed together. An organized community can change promptly to a

superior variety when a definite advantage can be shown. The Pima variety was substituted for the Yuma in the Salt River Valley in one season, after a sufficient stock of seed had been raised. Choice of varieties also is limited at present by the fact that stocks of pure seed are obtainable for only a few kinds. The first one-variety communities in each district will profit especially by selling seed to other communities. Pure seed sells as readily in carload lots as in bushels or tons. Community organization in the Salt River Valley has made possible a rapid extension of Pima cotton because a larger supply of pure seed is available than with any other variety.

EGYPTIAN COTTON COMMUNITIES IN ARIZONA.

It is appreciated in Arizona that the Pima cotton crop of the Salt River Valley communities in 1919 returned about \$20,000,000 or nearly twice the cost of the Salt River reclamation project, including the Roosevelt dam, electric power-plants, and irrigation canals. The value of land suited to cotton has doubled or trebled in the last few years, some of it selling at \$500 per acre. With reduced production in Egypt and loss of the Sea Island crop through the boll-weevil, the automobile tire industry becomes acutely dependent upon the Pima cotton raised by the Southwestern communities. In the spring of 1920 manufacturers are offering to guarantee a minimum price of 60 cents per pound, or to make contracts at 80 cents a pound, so that a very rapid extension of Pima cotton may be expected, not only in the Salt River Valley, but in the Yuma, Imperial, Coachella and San Joaquin Valley.²

¹Winters, R. Y., 1919, Community Cotton Improvement in North Carolina, *Journal of the American Society of Agronomy*, 2:121.

²See U. S. Dept. Agric. Bul. 533, "Extension of Cotton Production in California," and Bul. 332, "Community Production of Egyptian Cotton in the United States." The community plan in relation to cotton production was outlined in the Yearbook of the U. S. Dept. of Agric. for 1911, pages 397-410, under the title "Cotton Improvement on a Community Basis." Other papers that discuss community features are U. S. Dept. Agric. Bul. 60, "Relation of Cotton Buying to Cotton Growing," U. S. Dept. Agric. Bul. 288, "Custom Ginning as a Factor in Cotton Seed Deterioration," U. S. Dept. Agric. Bul. 324, "Community Production of Durango Cotton in the Imperial Valley," U. S. Dept. Agric. Bul. 742, "Production of American Egyptian Cotton," and Bureau of Plant Industry Circulars "Cotton Selection on the Farm by the Characters of the Stalks, Leaves and Bolls" and "Tests of Pima Egyptian Cotton in the Salt River Valley, Arizona."



FRUIT CLUSTER OF THE CUMBERLAND BLACK RASPBERRY

This is a variety belonging to the species *Rubus occidentalis*. The black raspberries under cultivation are natives of North and South America though other species occur in Asia. (P 922.) (Fig. 17.)