

FIBRES.

PRODUCTION OF HENEQUEN FIBRE IN YUCATAN AND CAMPECHE.

The following extracts are taken from the United States Department of Agriculture—Department Bulletin No. 1278 on "Production of Henequen Fibre in Yucatan and Campeche" by H. T. Edwards, Specialist in Fibre-Plant Production, Office of Fibre-Plant Investigations, Bureau of Plant Industry.

INTRODUCTION.

Henequen (*Agave fourcroydes* Lem.) fibre has been imported in steadily increasing quantities into the United States during the past 40 years. The average annual imports of this fibre, which were 40,000 tons during the 5-year period 1887-1891, had increased to an annual average of 148,000 tons during the 4-year period 1918-1921.

The two features of the henequen situation of special interest to the American farmers are that this fibre constitutes the main source of supply of the raw material used for the manufacture of binder-twine and that practically all the henequen imported into the United States is obtained from the States of Yucatan and Campeche. The condition of their henequen industry therefore has a very important bearing on the welfare of the grain-producing industry of the United States.

OUTLINE OF THE BINDER-TWINE FIBRE SITUATION.

The United States consumes annually from 100,000 to 150,000 tons of binder-twine and exports from 30,000 to 50,000 tons.

This twine is manufactured from henequen, sisal, abaca (pronounced a-ba-ka; Manila hemp), maguey, istle, and phormium (New Zealand flax) fibres. Henequen fibre, with the exception of a very small quantity, is obtained from Yucatan and Campeche; the sisal principally from Java, East Africa, and the Bahama Islands; the abaca and maguey from the Philippine Islands; the istle from Mexico; and the phormium from New Zealand.

During recent years, because of unsettled conditions both on the plantations and in the world markets there has been considerable variation in the relative quantities of these different fibres used for binder-twine purposes. For a long period, however, Yucatan henequen has been the principal fibre used for the manufacture of binder-twine.

During the 10-year period, 1911-1920, the average annual imports of henequen and sisal into the United States were 163,703 tons, valued at \$28,507,956. The greater part of this fibre was used for the manufacture of binder-twine, and for many years more than 90 per cent. of the combined total imports has been henequen.

From 1915 to 1921 the available supply of this fibre was irregular, there was a great fluctuation in the price, and the market was very unsettled.

Since January 1, 1922, the production, although much less than that of earlier years, has been fairly regular, and a stable-price has been maintained.

Even with a gradual improvement of conditions in Yucatan, there is likely to be a shortage of henequen fibre for several years. Since there is no probability of any marked decrease in the world consumption of binder-twine, any shortage in supply of henequen fibre must be met by an increased production of other fibres suitable for binder-twine purpose.

IMPORTANCE OF HENEQUEN IN YUCATAN.*

The production of henequen is by far the leading industry of Yucatan. In value this fibre constitutes about 85 per cent. of the total exports, and others of importance being chicle gum and hides.

Both soil and climatic conditions are peculiarly well adapted to the cultivation of henequen, whereas they are ill adapted to the cultivation of most of the other staple crops of the Tropics. Under these circumstances the maintenance of the henequen industry in a prosperous condition is a matter of vital importance to the people.

CLIMATIC CONDITIONS.

The climate of Yucatan is tropical, the lowest recorded temperature being 48°F. The precipitation is relatively low, approximately 30 inches per annum, and there is a long dry season. These conditions are favourable for henequen, although occasionally during an exceptionally long dry season even this hardy plant suffers some injury. It would be difficult to find any other staple tropical crop so well adapted to the climatic conditions of the northern part of the State.

SOIL CONDITIONS.

In the area utilized for the production of henequen the surface is relatively flat, slightly rolling, and somewhat broken. The soil is largely composed of a porous, partially decomposed limestone in which there are numerous pockets and in places a thin fertile covering. The land is so rocky that trees cannot be planted until holes have been blasted for them to grow in, and frequently even the small henequen suckers are propped up with small stones in places where there is practically no soil. Under these conditions the profitable cultivation on a commercial scale of any other crop would be exceedingly difficult if not impossible. These unusual soil conditions, however, are practically ideal for henequen.

Although it will thrive on land having but little soil, there are kinds and degrees of "rockiness" favourable and unfavourable for this plant. For instance, the soil conditions in the vicinity of the town of Motul are regarded as exceptionally favourable, for the reason that in this section the soil is filled with medium-sized and small rocks rather than having the unbroken strata of rock found in certain other localities.

The soils found in the eastern and southern sections of the henequen areas of Yucatan and in Campeche are more fertile and less rocky than the soils of north-central Yucatan, which is the principal producing region. Most of the planters believe that the fertile soils are not favourable for henequen. One objection to its cultivation in such soils is the increased cost of keeping down the weeds and under-growth which grow very quickly in this country even on rocky lands.

* This report is based on field investigations made in Yucatan and Campeche during June and July, 1923, by H. T. Edwards, who wrote it immediately upon his return. Important changes have taken place since.

GEOGRAPHICAL DISTRIBUTION

Henequen is widely distributed throughout a large portion of the States of Yucatan and Campeche, but the principal fibre-producing area is a district which extends for about 60 miles south of Progreso and approximately the same distance east of Progreso and Merida. The town of Motul, about 30 miles north-east of Merida, is the centre of one of the largest and most prosperous henequen-producing sections. The conditions in this district are specially favourable. Good yields are obtained, and the fibre is of excellent quality. Many of the lands lying between Merida and Progreso are planted to henequen, and there are a number of large plantations south of Merida. A large part of the lands lying on both sides of the railway between Merida and Temax is planted to henequen. To the north, between Temax and the sea, the henequen belt extends somewhat farther to the east. Along the seacoast east of Progreso and north of Merida, Motul, and Temax there is a belt of jungle land, roughly from 3 to 5 miles wide. Throughout this uncultivated area are many scattering plants of wild agaves, including henequen apparently introduced from the plantations and other species that may be indigenous. Henequen is not known as an indigenous plant.

AREAS PLANTED

There is considerable variation in the figures furnished by different native authorities on the total area planted to henequen, the relative areas in large, medium, and small plantations, and the relative areas in old, medium, and young plantings.

The Comisión Exportadora de Yucatan, which handles all the fibre and is in closer touch with the industry in Yucatan and Campeche than any other agency, estimates the total area planted to henequen in these States as 5,400,000 mecatas,* which is equivalent to 216,000 hectares or approximately 540,000 acres, of which 40 per cent. is in large, 30 per cent. in medium, and 30 per cent. in small plantations. The large plantations range in size from 3,000 to 6,000 acres. The "San Francisco" in the Motul district, said to be the largest plantation in Yucatan, has approximately 6,500 acres planted to henequen.

Only an approximate estimate can be made of the relative areas in young, medium, or producing, and old plantings. Such an estimate in July, 1923, indicated that about 50 per cent. of the total area, or 270,000 acres, was in the producing state; about 40 per cent. or 216,000 acres, in plantings 2 to 6 years old; about 8 per cent. in plantings less than 2 years old; and about 2 per cent. in old fields that had ceased to be profitable.

The total number of henequen plantations in Yucatan is variously reported to be anywhere from 200 to 850, according to what is considered a "plantation." There are probably between 500 and 800 properties which may properly be so regarded. One report shows a total of 550 plantations, of which 19 have an annual production in excess of 500,000 kilos (over 1,000,000 pounds) of fibre, 75 an annual production in excess of 100,000 kilos of fibre (more than 200,000 pounds), and the remaining 456 a smaller production. The total exportation of henequen fibre from Yucatan during 1923 was 612,745 bales, or approximately 248,000,000 pounds, of fibre.

* The mecate, which is approximately one-tenth of an acre, is the unit of surface measurement used in Yucatan.

More accurate statistics of acreage with respect to the age of the plants would be desirable as a basis for estimating the production during the next six years. The young plants do not yield fibre until six or seven years after they set in the field, and the old plants yield reduced quantities, so that under normal conditions it is not profitable to harvest leaves from them.

COST OF PRODUCING HENEQUEN FIBRE

With the fluctuating cost of labour and the wide variation in conditions on different plantations, it is difficult to obtain data that will satisfactorily show the average cost of producing henequen in Yucatan at the present time.

One itemized statement prepared by a planter shows a producing cost of 2½ cents United States currency per pound. An estimate furnished by another planter shows a producing cost of 3 cents per pound. It has been stated that the producer who receives 3½ cents per pound for the fibre at the plantation can clean the fields already planted, harvest leaves, and prepare the fibre under existing conditions at a small profit. This profit, it is claimed by the planters, is not sufficient to provide funds for the planting of new areas or to encourage new planting.

PRESENT PRODUCTION

The production of henequen fibre in Yucatan and Campeche during recent years, according to data furnished by the Comisión Exportadora, has been as follows :

PRODUCTION FROM 1912 TO 1923

		Bales			Bales
1912	...	814,610	1918	...	768,723
1913	...	836,950	1919	...	664,972
1914	...	964,862	1920	...	953,034
1915	...	949,639	1921	...	626,980
1916	...	1,191,433	1922	...	434,038
1917	...	733,832	1923	...	612,745

CONDITION OF PLANTATIONS

The condition of the plantations in Yucatan in July, 1923, although by no means all that could be desired, appeared to be improving. Work of cleaning the abandoned and semi-abandoned fields had been organized, funds had been obtained for financing this work, and considerable progress was being made. Large areas still remained to be cleaned, however, and there were many fields so badly overgrown that they would have to be either replanted or abandoned altogether. The Comisión Exportadora stated that it was not possible to furnish data showing the areas in satisfactory condition, in poor condition and considered as abandoned.

The situation with respect to the planting of new fields was less satisfactory than the degree of progress that had been made in cleaning the fields. There were relatively large areas of henequen from 2 to 5 years of age, but comparatively little planting had been done during the preceding 18 months.

MARKET SITUATION

During the latter part of 1921 Yucatan henequen was selling at a price of 2¼ cents Gulf, that is delivered at New Orleans or Mobile. The market was in a badly disorganised condition, there were large stocks of unsold

fibre in the United States, the plantations in Yucatan were steadily deteriorating, and there existed a marked degree of uncertainty as to the future of the industry. Early in 1922 the Comision Exportadora de Yucatan, the selling agency of which in the United States is the Sisal Sales Corporation, assumed the direction and control of the marketing of practically the entire output of Yucatan and Campeche.

The efforts of these two organizations have served to stabilize the market and check the decline in production, at least for the time being. There has been collected, compiled, and co-ordinated a large mass of data regarding the henequen industry in Yucatan. These records show in great detail the organization, equipment, systems of management, and the results that are now being obtained on the plantations. The quality of fibre has been somewhat improved by maintaining in the warehouses at Progreso a system of grading and standardization. A considerable part of the stocks of old fibre has been sold, and a stable price in the world markets has been maintained.

The selling price of $6\frac{1}{2}$ cents per pound for henequen, maintained with a variation of less than $\frac{1}{4}$ cent in this country throughout the years 1922 and 1923, is about $\frac{5}{8}$ cent above the average price during the years 1890 to 1914. The prices of other hard fibres, abaca, African and Java sisal, and Manila maguey, varied somewhat, with an average net increase of nearly 1 cent per pound during the two years. The price of henequen, in comparison with the prices of these other fibres, indicated a relative market value approximately the same as that shown by quotations in pre-war years, falling below somewhat toward the close of the period.

The planter in Yucatan has received $3\frac{1}{2}$ to $4\frac{1}{2}$ cents United States currency per pound for the fibre delivered at Progreso. An export duty ranging from 1 to $1\frac{1}{2}$ cents per pound is collected by the Government of Yucatan. The freight, exclusive of lighterage, from Progreso to New Orleans or Mobile is between 15 and 20 cents per 100 pounds, and 7 to 10 cents more to Philadelphia, New York, or Boston.

FUTURE PRODUCTION OF FIBRE

It has been estimated by the Comision Exportadora that the production of henequen fibre in Yucatan and Campeche will be approximately 600,000 bales for 1923, 700,000 bales for 1924, and 800,000 bales for 1925, with a continued production of about 800,000 bales per annum for a number of years. Other estimates indicate that production may either fall below or exceed these figures.

There are a number of different factors in the henequen industry concerning which there is an element of uncertainty, any one of which may materially affect the future production of this fibre. Many of the larger planters are heavily in debt and are without necessary capital for the efficient operation of their plantations. There is a shortage of labour, a marked degree of restlessness among the plantation labourers, and constant fluctuation in the wage scale. Any marked increase or decrease in the world consumption of henequen or in the production of the different fibres which compete with henequen will materially affect the situation in Yucatan.

HENEQUEN IN CAMPECHE.

The State of Campeche adjoins Yucatan, and the production of henequen in these two regions may be regarded as essentially one industry. Although there are certain differences in the soil conditions and in the system of cultivation, the situation in these two countries is practically the same.

The henequen industry of Campeche has suffered even more severely than that of Yucatan during the past few years. The production of henequen fibre in Campeche, which was formerly about 50,000 bales per annum, is now only 20,000 to 25,000 bales, and the rehabilitation of the plantations in that State is proceeding rather more slowly than in Yucatan.

The soil is less rocky and more fertile than that of the henequen areas of Yucatan. In consequence, the Campeche plants grow more vigorously, but the weeds and brush also flourish. It is claimed by the Campeche planters that this fibre is in every respect as good as, if not superior to, the Yucatan fibre.

The labour situation is very unsatisfactory. There is a great shortage of plantation labour, and the wages are high. Many of the labourers who formerly lived in the country on the plantations are now moving into the towns. Increasing areas are being planted to food crops, and the labourers who have an abundant supply of food are not disposed to work on the henequen plantations.

An organized effort is being made to rehabilitate the industry. Funds have been loaned to the planters for cleaning and replanting their fields, and fairly satisfactory progress has been made in this work.
