

CHAPTER I

INTRODUCTION

1.1 General

Jute bags and hessian are the cheapest packaging materials for grains and engineering goods. Good quality hessian is used as the backing material for carpets in various parts of the world. The latter forms the major item for export of jute manufactures, which runs to the tune of 3000 million rupees. As a fibre jute occupies a place next to cotton.

On an average, about 0.8 million hectares of land is under jute cultivation in India, total fibre produced being around 1.1 million tonnes. Leaving only 10% of the amount for export and other purposes, the entire jute is processed in Indian mills (6,31).

Jute is obtained from the bark of two cultivated species of genus, Corchorous, viz. C. capsularis and C. olitorius of the Tiliaceae family. Plants generally shoot up straight upto 2 to 4 metre heights, without branching, as shown in Fig.1.1. A transverse section, Fig. 1.2, of the plant shows that there are three zones, viz. (i) the central woody part or the stick, constituting about 70% of the total area, (ii) a thin outer layer of epidermis, which is partly permeable to water, and (iii) groups of fibre bundles in the form of wedges surrounded by other cells and juicy or gummy matters, lying in between the two zones.



Fig. 1.1 A C. capsularis jute plant (variety: JRC-212)



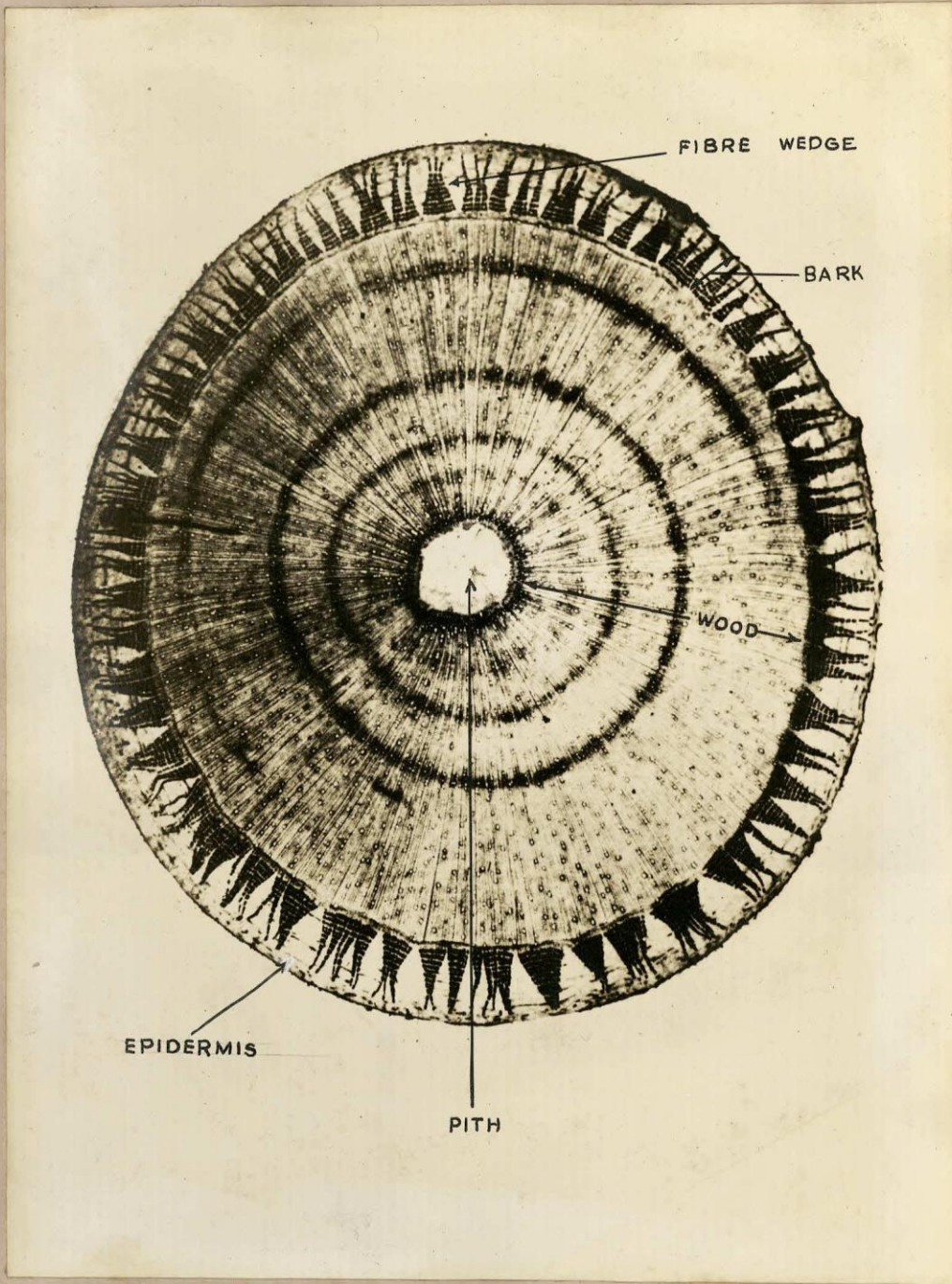


Fig.1.2 Transverse section through the mature jute stem (variety: JRC-212)

To extract the fibre the plant is kept immersed in water for a few days when the gummy matters and epidermis are eliminated by the retting process.

1.2 Importance

Jute retting in water is a biological process. Traditionally, after completion of the required period under water, when the fibre is loosened, its extraction is done manually. But sources of clean and good water are already scarce and are diminishing fast. As a result family ponds are gradually used for retting purposes. These cause air pollution and provide breeding grounds for mosquitoes. Because of the conversion of family ponds into retting tanks, fish culture is also suffering a set back.

It is an established fact that good retting is essential for the production of quality jute fibre. But fibre obtained from different regions of the country in the states of West Bengal, Assam, Bihar, S.E. Orissa, Tripura and Eastern U.P., differ in quality due to the presence of defects in the fibre caused by scarcity of water and inefficiency of labour. Mills have to choose their requirements from all these fibres of diverse quality. 'Root' content or the fibre with unseparated epidermis, particularly in capsularis, is a serious defect and normally 10 to 50 per cent of the total fibre is lost as 'cuttings'. Disposal of such a huge material poses a problem for the mills (35). Though 'root cuttings' are put

to inferior uses, this is a national wastage. Because of these defects in fibre, farmers are deprived of proper price for their produce.

Jute retting and its extraction are labour intensive processes. These sometimes lead to the production of over- or under-retted fibres due to non-availability of labour in time because the retting season happens to coincide with other intensive agricultural practices comprising of different crops. Moreover, due to 2 to 3 folds increase of labour wages in recent years, cost of production of jute has gone up. Jute retting needs skilled labourers, who are expected to work in waist-deep foul water. But now a days such skilled labourers dislike to work in such a condition.

It is, therefore, necessary to solve these problems, by devising some alternative methods of extraction which would require less water, minimise handling of plant material in foul water and produce uniform quality fibre.

1.3 Justification

Demand of jute is dwindling as synthetics are making in-roads into the traditional jute markets. Either the country has to sustain the loss of foreign exchange by stoppage of jute cultivation or it has to reduce the cost of production of jute and improve upon fibre quality in order to compete with synthetics.

It is difficult for a country to suddenly change the cropping pattern evolved so carefully around jute since long, affecting about half a million farming families. It is also difficult to arrange alternative jobs for a quarter million workers engaged in jute industries directly and another quarter million other people engaged in the associated sectors of this industry.

Thus to maintain the economy of the country, constant research efforts on the improvement of production rate as well as quality, particularly on suitable alternative methods of fibre extraction, are not only necessary but also fully justified.

1.4 Research Proposed on Alternative Extraction Procedure

Any new proposal for research and development on fibre extraction method should, therefore, aim at reduction of water requirement, job satisfaction of skilled labourers, and improvement in quality.

As evident from the high proportion of wood in plant, water requirement may be reduced if the woody part or the jute-stick is removed before the retting operation. This would reduce retting time too. There are two ways of doing this, viz. (1) by removing the stick only by a machine called 'ribboner' and retting the bark only which contains the fibre and the epidermis layer; but the bark being preferentially exposed on