APPLIED SCIENTIFIC RESEARCH CORPORATION OF THAILAND

RESEARCH PROGRAMME NO. 1

PRODUCTION, PROCESSING, AND UTILIZATION OF KENAF AND ALLIED FIBRES

RESEARCH PROJECT NO. 1/4

EFFECTS OF PLANT VARIETY, GROWING CONDITIONS, AND AGRONOMIC FACTORS ON THE YIELD AND QUALITY OF KENAF FIBRE

REPORT NO. 1

EVALUATION OF KENAF FIBRE SAMPLES FROM THE DEPARTMENT OF AGRICULTURE NON SUNG VARIETY TRIAL, 1964

BY

WILLIAM L. GREENHILL

FIBRES AND TEXTILES GROUP

TECHNOLOGICAL RESEARCH INSTITUTE

ASRCT, BANGKOK 1966

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By William L. Greenhill*

SUMMARY

Results are given of strength and diameter measurements on fibre samples from four replications of 31 kenaf varieties. The data are used to calculate spinning quality. At least three of the samples proved to be comparable with Pakistan jute.

INTRODUCTION

The aim of this project is primarily to evaluate the quality of the fibre obtained from various agricultural field trials. It is realised that factors in addition to fibre quality must be taken into account when assessing the relative merits of different treatments or plant varieties but these factors are not considered in the present report.

Commercial grades of fibre, based on such factors as colour and cleanliness, reflect largely the care taken in processing the fibre and give little indication of its intrinsic spinning quality. From the latter point of view the important fibre properties in kenaf and similar fibres are diameter and strength. Coarse or weak fibre produces poor yarns. Length is also important in staple fibres such as cotton but with kenaf the length is formed at the cards and is not basic in the material; it depends on the strength of the raw material, strong fibres withstanding the shock loads at the carding better and giving longer fibre length. There is thus no need to measure fibre length directly; a knowledge of the ballistic strength of the raw kenaf fibre is sufficient and this property, combined with fibre diameter, enables yarn quality to be predicted with considerable accuracy. (Mather 1964).

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MATERIAL AND METHODS

The kenaf fibre samples for which results are given in the present report were forwarded to the Corporation by the Department of Agriculture from its Non Sung Experiment Station. The fibre was clean and well retted. It had been obtained from 4 replications of a 1964 variety trial involving 31 varieties (or species) and known to ASRCT only by numbers. The fibre samples weighed only a few hundred grammes each and were, in fact, much too small. This meant that many fewer tests could be made than is considered desirable and the accuracy of the results suffers accordingly. Fibre samples of at least 1 kilogramme should be provided for evaluation tests of this type.

Mean fibre diameter was determined by an air-permeability test (Mather 1963), the apparatus being generally similar to the "Micronaire" used for cotton. Ballistic strength was measured as the energy absorbed by a swinging pendulum which breaks a bundle of fibre stretched across its path. Yarn quality is expressed as the winding breakage factor, k, which defines the breakage rate when the yarn is would at a constant tension. This is an important feature of the yarn as it really defines the weak places or minimum strength. It is calculated by the formula:

$$k = -0.18D + 0.19B + 9.20$$

where D = average fibre diameter in microns

B = average ballistic energy absorbed in gm.cm per tex

RESULTS AND DISCUSSION

The results are given in Table 1. It will be seen that the main factor influencing the relative quality of these samples is the fibre diameter. A comparison may be made between the present values for fibre diameter and those usually found for Pakistan jute which are within the range 34 to 42. Values of k approaching or above 3, indicate a very acceptable fibre so that at least three of the samples (the last on the list) are worthy of serious consideration.

TABLE 1

DEPARTMENT OF AGRICULTURE FIBRE TESTS

NON SUNG VARIETY TRIAL 1964

Variety no.	Average ballistic strength B					Average fibre diameter D					Breakage factor k
	1	2	3	4	Mean	1	2	3	4	Mean	
1	3.5	4.4	5.1	4.7	4.4	40.9	46.4	42.4	44.9	43.7	2.2
6	3.8	4.1	3.9	5.0	4.2	38.5	44.2	40.8	42.5	41.5	2.5
9	4.0	3.8	3.9	3.8	3.9	39.7	44.7	40.1	38.6	40.8	2.6
10	3.4	3.1	4.6	4.7	4.0	46.0	42.7	38.3	42.5	42.4	2.4
13	3.8	3.5	4.7	4.2	4.1	39.7	43.6	42.7	40.4	41.6	2.4
15	4.0	3.9	4.4	4.4	4.2	41.2	43.1	42.8	42.6	42.4	2.4
22	3.7	4.1	5.0	4.8	4.4	38.3	45.3	43.2	43.7	42.6	2.4
23	3.8	3.6	5.3	4.8	4.4	39.2	46.1	42.4	43.1	42.7	2.4
26	3.9	3.8	4.2	4.0	4.0	43.3	42.1	43.2	41.8	42.6	2.4
29	3.6	4.3	3.9	5.7	4.4	40.6	44.4	43.9	39.3	42.1	2.4
31	3.2	3.1	5.2	4.9	4.1	39.7	41.6	43.5	41.9	41.7	2.5
34	3.3	3.8	4.5	3.8	3.9	39.5	42.1	42.0	42.1	41.4	2.4
37	4.0	3.3	4.4	4.3	4.0	39.4	43.4	39.1	42.1	41.0	2.5
39	3.7	3.8	4.4	5.2	4.3	38.2	42.0	44.0	39.1	40.8	2.7
40	3.3	3.7	4.5	5.4	4.2	39.9	42.4	39.0	42.7	41.0	2.6
42	3.5	3.7	4.2	4.1	3.9	39.6	38.6	38.4	40.4	39.3	2.8
43	3.3	4.0	4.2	4.9	4.1	40.7	40.4	40.7	41.1	40.7	2.7
44	3.7	3.7	4.6	4.0	4.0	39.2	42.3	42.1	40.7	41.1	2.5
45	3.9	4.3	3.7	4.4	4.1	41.4	44.1	39.6	41.4	41.6	2.5
49	3.7	3.3	4.2	4.1	3.8	38.4	38.2	43.2	41.4	40.3	2.7
51	3.6	3.8	4.3	5.0	4.2	40.5	42.2	41.8	42.8	41.8	2.5
52	4.2	4.8	4.7	4.3	4.5	42.2	43.2	43.9	40.1	42.4	2.4
56	4.0	3.8	3.9	5.1	4.2	40.5	40.4	41.0	41.2	40.8	2.7
59	3.8	3.4	4.4	5.1	4.2	44.5	46.2	44.1	42.3	44.3	2.0
60	3.3	3.8	5.2	4.0	4.1	46.0	43.7	40.0	41.1	42.7	2.4
61	3.9	3.6	5.2	5.7	4.6	40.3	43.2	43.1	43.9	42.6	2.5
62	3.5	4.2	5.4	5.2	4.6	41.9	42.4	40.2	42.7	41.8	2.6
63	4.0	4.8	5.1	5.3	4.8	44.0	41.6	42.5	44.8	43.2	2.3
66	3.8	3.5	4.3	4.6	4.1	33.9	38.1	41.0	38.5	37.9	3.2
67	3.6	4.8	4.8	3.6	4.2	34.6	38.8	35.8	36.0	36.3	3.5
68	4.1	3.5	5.1	4.6	4.3	38.2	38.6	39.3	38.5	38.7	3.0

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